AUTOBIOGRAPHY OF A SURGEON

JOHN MORRIS DODD

225

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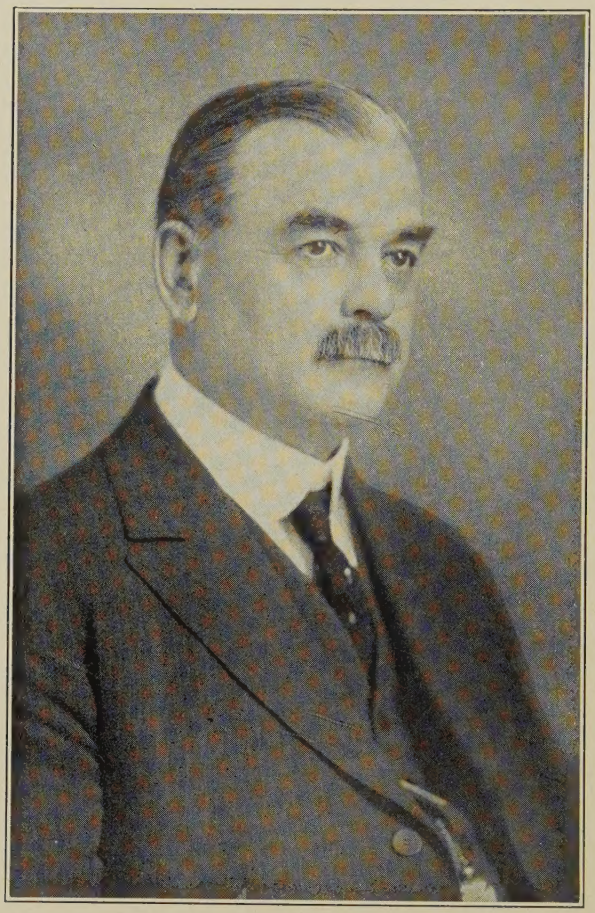

J. McDodd M. D.

Frontispiece

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BY

JOHN MORRIS DODD, M. D., F. A. C. S., D. Sc.

WALTER NEALE

Publisher of General Literature

NEW YORK

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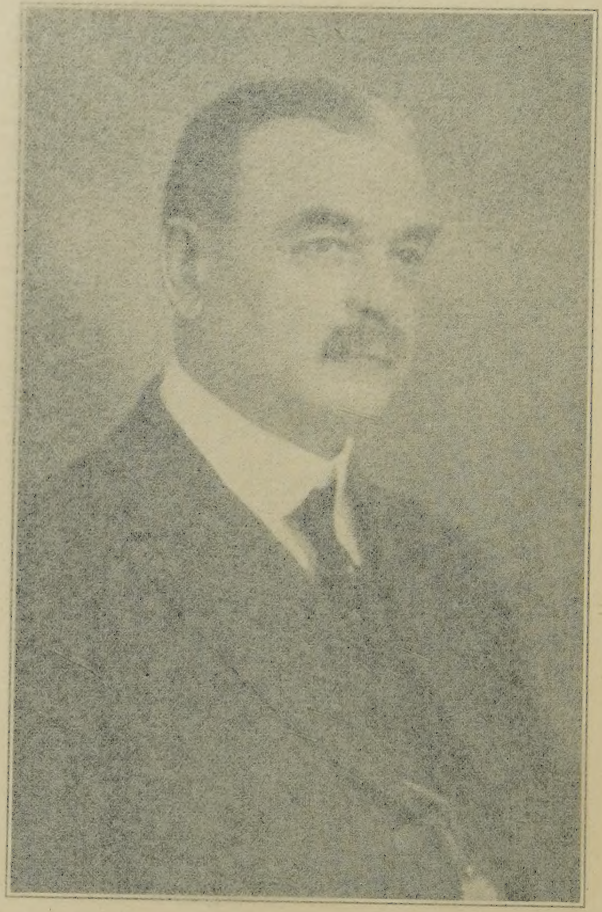

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CONTENTS

	PAGE
Preface	9
Beginnings	11
Recollections of Boyhood	31
On the Farm	38
Woodcraft	54
School Days	62
The Carpenter Trade	67
Medical Education	73
Early Practice	85
Some Interesting Experiences	94
The Bicycle and the Automobile	108
Photography	115
As a Citizen	118
Northland College	126
London in 1914	131
War Service	140
Europe in 1921	146
Some Doctors I Have Known	153
The American College of Surgeons	162

Part Two

Introduction	167
Bacteriology (1897)	169
Peritonitis (1908)	192

PAGE

Conservative Surgery of the Ovaries (1909) . . . 201
Sepsis (1910) 207
Presidential Address (1914) 216
Conservative Surgery of the Extremities (1915) . 221
The Hospital's Obligation (1916) 230
Standardization of Hospitals (1918) 241
Ligation of Femural Artery in Middle Thigh (1922) 258
End Results in Fractures (1922) 261
Treatment and Results in Fractures (1923) . . . 270
The Surgical Treatment of Burns (1924) 278
Preservation of Function After Injuries to the Feet (1924) 285
Group Practice (1927) 291
Social Service (1927) 296
Cancer (1928) 301
Surgery (1928) 307

LIST OF ILLUSTRATIONS

Portrait of John Morris Dodd . . . . . *Frontispiece*

FACING PAGE

My Birthplace 11
The Covered Bridge 23
Its Successor 23
Race Track and Fair Grounds of Waynesburg, Pa. . . . 24
My Home on the Farm 28
Portrait of Myself at Eight 38
Portrait of Myself at Eighteen 38
The Old School House 62
Faculty of Starling, 1889 73
Graduating Class at Starling, 1889 75
Ashland General Hospital 92
A Covered Sleigh 100
A Snowmobile 100
My First Automobile 106
Nash at the Same Place 106
The Snowmobile—Dr. A. W. Lockart 113
A Buick in 1910—Dr. A. O. Shaw 113
The Monolith 120
Northland College, Trustees, Faculty, and Students, 1926 126
In Front of Medical Service Building 140
Dr. Edwin Ellis in His Buckboard 153
Banquet in Honor of Dr. Ellis, 1896 161

PREFACE

For some years I have thought that some day I should write down, for those who might care to read, the experiences and observations of a lifetime spent on the frontiers of our country through the most wonderful period of the world's history.

These annals will probably interest those who have shared the experiences here recorded, and will instruct students of history in that which pertains to the living conditions and customs of the pioneers who have made possible the wonders of the world in which we live, and the benefits of which we enjoy.

To obtain the objects sought it is necessary to be personal; and with few exceptions the things herein set forth are from my own experience and observation and what I have actually seen. The humble achievements of the writer should absolve him from any suggestion of egotism, and this record may be accepted as the memoirs of one who has aimed at the stars, but never reached them.

Man is very largely a creature of environment. He may attain happiness, contentment, and a measure of vocational and social success in an obscure frontier; but sooner or later he comes under the influence of the call of civilization to higher levels of association and service, and he joins in the general advance of science, art, and social organization.

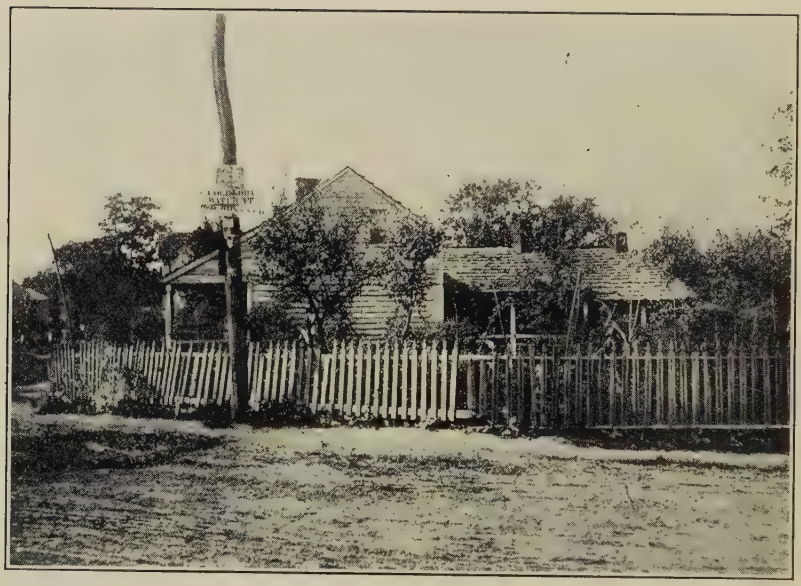
Thus, I have been transplanted from one frontier to another and from one vocation to another, until I found

the work for which I seemed best fitted: a sort of university training in the rough. Though far from the urban centers of learning, I have kept up contact with the leaders of my profession, and have pursued as closely as possible the advances of science.

With a perspective that takes in many of the doings of men, their adaptation to environment, their grasp and utilization of the forces of Nature, I view from my standpoint, over a vista of sixty years, that which fills me with wonder and a spirit of thankfulness that I have been a unit in a generation that has seen and accomplished so much.

JOHN MORRIS DODD

Ashland, Wisconsin
September, 1928



My Birthplace

Facing page 11

AUTOBIOGRAPHY OF A SURGEON

I

Beginnings

From a past that seems to have no beginning, I emerged into the sphere of conscious existence at the age of about two years.

The proof of this early tracing of mental impression, resulting in memory, lies in the fact that I remember my mother who died when I was two years old. Family records say I was born October 5, 1866.

My father, Dr. Samuel Dodd, died a year before my mother, so I have no recollection of him and know him only through family tradition. He had come from England some time in the 'fifties; practiced as a veterinary surgeon; served through the Civil War, and died July 7, 1867. Of his ancestors and family I have never known, though it is a fairly common English name. My mother was a descendant of the Knickerbockers of New York, and her great-grandfather, William Morris, lies buried in Trinity churchyard in New York City. Richard Morris, his son, came to Western Pennsylvania in 1800, where he bought 137 acres of land, the present site of the village of Morrisville, or Dotysburg, as it was called for a time.

John Morris, son of Richard, was my grandfather. He was married twice. Of the children by his first wife there were Hannah, Betty, James, Richard, and others

whom, due to the lack of family records, I cannot name. It is said that there were Eleanor, John, Eliza, Harriet, Job, George, Thomas, and Catherine. Catherine was my mother. Another son, Ingram, died in childhood.

Instead of the public record of births and deaths as kept today, such events were then jotted down in the family Bible in the crudest way, relying on the transmission of this book and its record to posterity for the preservation of the family history, and, in the absence of this Bible, recourse must be had to the tombstone in the graveyard to verify the traditions as to the date of birth and death.

By the death of our mother, my sister, four years my senior, and I, then deprived of parental care and guidance, fared as best we could among relatives who were already burdened with their own family responsibilities. The two orphans became the wards of our dear old grandmother, who passed to her reward when I was nine years old.

We were then placed among other relatives less interested in our welfare, and came on as best we could to take our places on the stage of life's drama.

As I look back across the sixty years through which I have lived, what a flood of memories flows through and across the picture. My birthplace was a village that nestled among the hills of Pennsylvania, where the foothills of the Allegheny Mountains slope away to the prairies west of the Ohio. A State road ran from east to west through this village, which was called Morrisville, after my mother's people, and which, during the early part of the past century, was a place of rest and refreshment for the travelers who up to some time after the Civil War passed through this region on the way

westward. Along it stock was driven from the west to the markets east, across the mountains, and a meager commerce was maintained by stage coach and otherwise. This road connected with the National Pike at Brownsville, at which point there was a bridge across the Monongahela River.

Taverns were there, as elsewhere, scattered all along the main-traveled highways; and it would require a volume to describe in detail these primitive forerunners of the modern hotel.

This village was a suburb of the county seat and a mile from the courthouse, from the steeple of which the clear-ringing bell sounded and echoed over the hills for miles on important occasions, and when court was in session. On the top of this steeple stood the statue of General Greene, after whom the county was named. The town itself was named in honor of General Wayne.

The settlers who came to this section across the mountains from the east found a little plateau between the surrounding hills and Ten Mile Creek, and there a settlement sprang up. Indians were there in those days,—and viciously hostile. A fort was built nearby, and its site was still pointed out to me when a boy. The traditions of those old settlers teem with romance and tragedy that, in thrilling experiences, cannot be surpassed by the annals of any other section of the new world.

A few feet under this plateau, and cropping out along the creek, was a vein of coal between layers of stratified rock, furnishing fuel in abundance; and the rock provided an excellent building material for the construction of houses. The hills were thickly wooded; but these pioneers found it easier to build houses of stone, for there were no means at hand to saw lumber, and it took

many hands to build a log house, whereas one man could build a stone house, with little or no help. In time the streams of the valleys were dammed, and saw-mills built wholly of wood with the exception of the saw, which was hung in a wooden frame and was propelled up and down with power supplied by an overshot or undershot wooden water-wheel. Grist-mills for the grinding of grain were numerous, and derived their power from the same source.

The usual accompaniment of this dam and mill was the mill race, which conducted the water to the wheel much the same as the conduit conveys the water from the dam to the turbine constituting the modern water-power. The remains of these old dams and mill-races are common today, but few of the old mills remain.

One such saw-mill was one of the wonders of my childhood. A little farther down the valley was a grist-mill with similar power, which ground grain for food for man and beast. A part of this mill was a distillery, or still-house, as it was commonly called, where whiskey was made and where we children were sent to get yeast for grandmother's bread.

The big overshot wheel of this mill, some twenty or thirty feet in diameter, was to me a ponderous and wonderful creation as we boys climbed over it, wondering how deep was the pool underneath, mentally gauging its depth by the sound of the "chug" when we dropped a stone into it. The walls of the dam gave way one day, and that wheel never turned again.

One of my misty recollections is of barefooted men, with trousers rolled above the knees, wading the mud in the bed of this dam after the water went out, gathering up the stranded turtles, which were highly esteemed for food. A half-century later I visited this site, and while

the grass-grown wall of the dam is still there, no vestige of the mill remains, except a mill-stone, which still lay there, apparently too heavy for vandal hands to carry away. There it remained, one of the last of its race, brought from Scotland a century ago. There is romance about these old mills and, doubtless, tragedy, if they could but tell it. Nearby lay an old log in my boyhood days that was pointed out to me as a place where as a child I was found one winter day, nearly frozen, after I had attempted to follow my grandmother somewhere.

"Going to mill" was an event in the early days, and even in my day I have gone on horseback, with a sack of corn on the horse before me, to one of these old mills and waited for the corn to be ground into meal, then carried it home in the same way. The old miller was one of the outstanding characters of his day. He has disappeared from the picture, and the cornmeal mush, corncakes and pone have largely disappeared with him.

My native village contained several stone houses, though my home was a frame one, built after the old saw-mill began to saw lumber. Across the street was the family burying-ground, walled in by stone and capped with flagstone. The quaint inscriptions on the old tombstones are now almost effaced by time and the elements. They were made of shale sandstone and were not durable like the marble and granite of a later period. Many similar stones are found in the cemeteries of England, testifying to the origin of these early settlers in the new world. Nearby stood the remains of an old stone church, on the site of which was built, when I was a boy, a brick church that still stands. In the construction of this building I first worked for wages, getting two cents a barrel for water carried for the masons. Needless to

say, I did not carry many barrelsful, as it involved pumping the water and carrying it in pails for a hundred yards or so. The stone wall of the graveyard later was used in the construction of a road, and an iron fence has taken its place.

Our house was a small frame structure a story-and-a-half high, with a porch and a kitchen some two feet lower than the rest of the house. The living-room had a coal-grate fireplace, while in the kitchen there was a large fireplace for wood, which, with its back-log, forestick, dog-irons, and a plentiful supply of wood between, provided heat for comfort and for cooking when the old-fashioned wood cook-stove in the corner was not in use. These old fireplaces were an interesting feature of pioneer life in that country.

Near the porch was the well, with curb, windlass, and the "old oaken bucket," and though its class has been condemned by modern sanitary science, fond memory still clings to the old bucket as,

> . . . dripping with coolness, it rose from the well.
> And now, far removed from that loved habitation,
> The tear of regret will instinctively swell.

The poet Woodworth has thus immortalized what science cannot efface.

That old kitchen, with its fireplace; its split-bottom chairs; its loom in the corner, on which grandmother wove carpet and other fabrics; the reel and spinning-wheel,—all rise before me in my recollections of childhood. There I spent many hours, helping grandmother sew carpet-rags, holding for her the skeins of yarn while she rolled balls, preliminary to knitting, which was one of her occupations of a busy life, making for herself and

wards a meager livelihood. It was beside this reel she was found one day, dead from apoplexy, which gave no warning and left no sign of struggle.

On a bed of coals in the fireplace she baked bread in an iron oven, too heavy for my childish hands to lift. Often have I watched her draw a red-hot coal from the fire with a poker and with her fingers flip it into her clay pipe, which was her constant companion while at work. Her pipe was her only vice, and could not be called such, for it was the common practice of the old folks of her day to smoke.

She was a devout adherent to the Methodist faith, and so strict was she, that she would not permit me to indulge in any of the weekday pastimes on Sunday, and whistling, which was one of my constant indulgences, must not be heard on the Sabbath. From my earliest recollections I was a faithful attendant at Sunday-school as well as day school, and to this day the old Methodist hymns keep running through my mind with association of events when they were learned.

Plain and crude were the furnishings of the home of that day. The well-to-do, of course, had their hair-upholstered furniture, ornate and deftly carved. Ours was the product of the cooper-shop, which was also the furniture factory of the pioneer: split-bottom chairs, straight-back and rockers, made of hickory; four-post beds with cord attached from end to end and from side to side over pegs set in the round wooden rods mortised into the corner posts. The network thus formed was the forerunner of the spring-mattress of today. They were high enough to accommodate the trundle-bed that at night made the bed for the children, and in the daytime was pushed under the bed, out of the way.

Upon this network of cord was placed the tick, filled with straw or feathers. The feather-bed was a mark of opulence, and was passed on from generation to generation, while the plebeian straw-tick was more common. It was more sanitary; for at house-cleaning period the tick was emptied, the contents burned, the tick washed and refilled with clean oats-straw. Linen sheets, with ornate pieced quilts of various colors, filled with cotton-batting or wool and sewed through and through, or tied with mattress stitches, formed the bed-covering, though sometimes the feather-tick served this purpose. The linen sheets were home spun from the flax grown for that purpose, and the processes of preparation for spinning and weaving were primitive indeed.

The houses of that period were heated from a fireplace in each room, either for coal or wood. Rooms not in regular use were cold and always damp in winter, and the warming-pan was in common use. This old custom of the English was brought to this country, and consisted of a pan with a lid, in which live coals were placed, and by means of a handle this pan was passed to and fro in bed until it was warmed. It was the custom in those days to endow the boy, on becoming of age, with a horse, saddle, and bridle, and the girl with a feather-bed,—a custom that now seems afar off. One still sees the feather-bed among the old country folk, as both bed and covering. Those feather-beds, which were in common use a half-century and more ago, were massive affairs, and to tumble into one was like jumping into a snowdrift. One was instantly covered on three sides, and to change position was no easy task. Like other things of those pioneer days, it has taken its place among fading memories of things gone by.

A necessary item of furniture in the olden home was the cradle, in which the baby was rocked to sleep.

These cradles were variously wrought,—some delicately and artistically made, some a mere box with wooden rockers; while some people boasted that as babies they had been rocked in a sugar-trough.

It was a strange custom that taught the baby it must be in motion to go to sleep; but it was universal, and even moved the poet to say, "The hand that rocks the cradle rules the world."

Modern medical science has taught,—and the teaching has been generally accepted by intelligent mothers,—that a normal baby will go to sleep when fed and laid away comfortably, but soon learns to demand that it be held or carried about,—while it is being hypnotized by motion or the cooing tones of its mother.

Babies are healthier nowadays, and the mortality and morbidity much less than a generation ago, while misguided maternal sentiment is not so large a factor in the rearing of children since mothers have learned to use good common sense in the care of their babies.

As I think of the march of civilization westward after the Revolutionary War, I marvel at the hardihood of those pioneers who struggled across the mountains and rivers, through almost continuous woods, in search of suitable places to establish homes. One wonders what the object was and why they stopped where they did. Most of the early homes seem to have been started at a spring, and there are many of them along the hillsides. Then the building site may also have been chosen for the view; or the lower edge of the forest may have been selected in order that the logs for building might be more readily rolled down hill. Often they were located in the

most inaccessible places,—perhaps the grave of some loved one stayed the adventurers' onward march. They have left no record to tell us why. Only the hardiest of pioneers would penetrate such a country, with all the attendant hardships, through and into a region infested with the most bloodthirsty Indians, far from neighbors or protecting forts. They built homes and connected up a continuity of trails to their neighbors and to the villages and growing centers of population.

As I have recently traveled over these old roads and trails, I wonder at what has been accomplished in a hundred years. How these pioneers wrought in wood, in stone, and in iron is a story that should be written and preserved. I had often wondered at the stone houses built in a wooded country. In recent years I have seen this same type of stone houses in Scotland and northern England, which exhibits the same architecture, with a fireplace in each room. Even in parts of London, today, as one looks out across and over a section of the city, the chimney-tops, one for each flue, are so thick as to resemble the stumps of a recently cut forest. I do not remember seeing a heating stove in my young boyhood. Open grates and fireplaces supplied the heat, and the furnace was not thought of, so firmly established was the custom of open fires, with an inexhaustible supply of fuel ready at hand.

My native county was densely wooded and was underlaid with three workable veins of coal. When I was a boy coal brought three cents per bushel at the coal bank, which was a mine worked into the outcropping vein on a hillside. After the coal was dug under and blasted down and broken up, it was wheeled out in wooden cars, then pushed by hand along a wooden track to a platform out-

side, where the stockpile accumulated. An old shaft in the village rises before my memory. The vein cropped out along the creek about sixty feet below the village level. Coal was loaded into a car, pushed out onto a cage, then drawn up with a rope wound around a drum set vertically with a sweep, to which a horse was hitched, and the drum was thus revolved and the car drawn to a track a few feet above the ground. From this point a track upon a trestle extended out some two or three hundred feet to the street. The car was pushed along this track by hand. The labor and ingenuity of the arrangement was something to be marveled at when we compare it with the methods of today.

Coal banks honeycombed some of the hillsides along the road; and we boys used to explore their depths, dark as dungeons, going in one and out of another, sometimes getting lost in their winding passages.

Many of our neighbors were miners, and they would come home at night blacker than negroes. They would generally take their bath in a washtub,—quite different from the modern dressing-rooms, showers, and other conveniences provided for the miner today, who cleans up after the day's work and gets into his automobile to go home. I can see yet the little tin lamps they wore on their caps, the picks, shovels, and wooden dump-cars. Those miners were native Americans. Now there are few of them who will follow such a humble pursuit.

One of the seasonable duties was to haul the winter's supply of coal before rain and frost made the roads impassable. Road conditions there in winter were a very serious obstacle to traffic. A turnpike surfaced with crushed limestone, which was plentiful in that region, was finally built through our village to the county seat. This

enterprise was the work of a duly constituted company, which, to provide for construction and upkeep, collected toll from the travelers; and, in order to make collection possible, toll-gates were placed on each side of the town. These gates were moved several times, as I remember, when new roads intersected and made a detour possible. It was surprising how the farmers would, at considerable inconvenience, go around these detours, to avoid the payment of two or three cents toll.

As that pike surface wore out, the stone was replenished from a rick of broken limestone by the roadside. This napping of limestone by men as they sat astride of the rick and broke the stone with a hammer, a perch or two a day, was a most primitive process when compared to the rock-crusher of today. The old toll-gate was a long pole hinged to a post. The short end at the roadside was weighted,—a rope, attached to the long end, brought the pole down across the road when necessary to bar the non-paying traveler, and he soon became known to the gatekeeper. One of my great uncles was for years a keeper of one of these toll-gates, and he occupied his time, between travelers, making brooms and split-bottom chairs.

Most people in those days traveled on horseback; and, strange as it may seem, men were recognized by the horses they rode or drove. The credulous gatekeeper was often imposed upon by the natives, who would say, "I'll pay when I come back." Many of them didn't come back that way. The pike, like most all the primitive things, has vanished. Its place is now occupied by a brick road; and brick, concrete, and asphalt have made possible a network of highways over those old hills, so

The Covered Bridge

Its Successor

Facing page 23

that travel, which fifty years ago took days, is now accomplished in hours.

The romance of those old days was enhanced by the covered bridges that, on all the main roads, spanned the streams. Some of these bridges, a hundred years old, still stand, and the framework is as sound as when it was hewn and framed into position. They are being replaced by concrete now, and it seems a pity to see them go.

Amid these scenes my early boyhood was spent. It seems almost a dream that this generation should have seen the pioneer and his methods of dealing with the problems that confronted him. It is doubtful if any other similar region could be found. This country, shut in by mountains and rivers, the Monongahela on one side and the Ohio on the other, was off the main lines of travel from east to west. Settled early, with no means of egress except by stage or boat, the early settlers of this region contented themselves with using the means of subsistence so bountifully supplied by Nature, combined with their own ingenuity in making homes for themselves in a wilderness. The soil was very fertile, and they soon learned to supply themselves with food and shelter without much need for communicating with the outside world. Thus they lived for several generations, little knowing fifty years ago that theirs was the richest section of the State. Oil and gas were found in great quantities, and the mining of coal in a large commercial way began a few years ago. This county had no railroad until 1876, when a narrow-gauge was built from Washington to Waynesburg. Winding over the hills, with numerous curves, it is still a curious spectacle. A broad gauge has in recent years been extended into the coal fields, and is now within a few miles of Waynesburg.

After grandmother's death, in 1875, my sister and I were taken to Illinois, to live with two uncles. I well remember the trip to Pittsburgh, where we took the train for the west.

Travel into and out of the county was by "hack," as the old stage coach, which was then the means of travel across-country and on the Western plains, was called. To go to Pittsburgh was half a day's ride in the hack to the river; then a night on one of the river packets brought the traveler to the city,—a trip now accomplished by motor in two hours.

This isolation naturally resulted in the continuance of many of the old customs and means of living. The craftsmanship of these old workers, developed by the necessities of the times, is most interesting as one who having seen it and its effects contemplates it in comparison with the arts of the present day. As a boy I helped make tallow candles, and saw the tallow-dip often in use. Now, I immediately flood the room with electric light, by merely turning a button. Our first lantern burned a candle. Gradually the kerosene lamp came into use, supplanting the candle, as it in turn has been succeeded by gas, then electricity. The first electric light shown in our country was an arc light in a circus tent.

I walked when a boy over those hills, and I have recently seen the aeroplane fly over them, and watched it as, when a boy, I saw the hawk, the crow, and the buzzard sail across the sky. I well remember seeing the sky darkened by the flocks of migrating wild pigeons, which are now extinct. Wild geese still presage the coming of spring and winter in their semi-annual migratory flights. "Darius Green and his flying machine" was a boyhood classic. Little did I then dream that one day I should

Race Track and Fair Grounds of Waynesburg, Pa.

Facing page 24

fly and the prophecy of the humorous poem would come true.

In this region, where Nature had supplied so bountifully the means of subsistence, it was only necessary for man to learn to adapt existing conditions to his needs. Depending almost wholly on the products of the soil, he must make provision for the non-productive season of the year.

The pioneer's means of preserving food for the winter are interesting to us now, who can get from the grocers' shelves or the butchers' refrigerator, anything in the line of food at any time of the year. To him, little was needed from the store except sugar and coffee, and these were often dispensed with.

Sugar was provided by the cane and maple and coffee was made from scorched rye, barley, or other grain. Salt was readily obtained from the numerous salt-wells. Fruits and vegetables were dried, or canned in tins sealed with sealing-wax. The cans were carefully cleaned and used over and over again. Potatoes, cabbage, and other vegetables were buried in pits,—a saucer-shaped cavity being scooped out and lined with straw and the vegetables piled in a conical heap covered with straw, then dirt, to the thickness of eight to ten inches. This protected them from freezing and kept them fresh. Apples were buried in the same way. Cabbage was pulled up by the roots, set head down in a trench, and covered with dirt, the roots sticking out. To dig a hole in one of these pits and draw out the contents by hand was a daily procedure, and made an extra coat-sleeve necessary, if one did not want to carry away a generous supply of the soil with him.

Many kinds of fruits and vegetables were dried and in

this way preserved. The dried corn of those days almost makes one wish for their return. Nowadays it is hard to procure.

It would be tedious to both writer and reader to review all these various procedures. They, too, reflect the adaptability of our forefathers to the conditions into which they had been transplanted.

Meat was raised on the farm. No provision could be made for keeping it, except by salting down or smoking it. The delicious hams, cured and smoked with hickory chips, cannot be equalled by the methods of the packing-house today.

Sometimes a beef would be butchered and, in order to dispose of it before spoiling, was peddled out among the neighbors.

Dairying was quite different from that of today. Milk was put in stone crocks, set in the cellar or spring-house, and if in the latter, usually in running water. After twenty-four hours the cream was skimmed and placed in the cream-jar until it became sour and ready to be churned. In winter the cream-jar stood by the fireside. The butter-making process was carried on in a wooden churn with a dasher with blades on the bottom end. This shaft was moved up and down by hand for a half-hour or so until the butter was separated and floated in a yellow mass on top of the buttermilk. The butter was then lifted out with a wooden ladle, put into a wooden bowl, and worked into a roll.

Butter, thus made under proper conditions of cleanliness, is superior in flavor to the creamery product of the present time. Cheese was sometimes made, but generally of the kind known as *smearcase,* or as we call it now, cottage cheese.

Pewter plates, seldom seen today, were common among the pioneers. They were indestructible,—an essential factor on the remote frontier. It seems odd to us now that it was the custom of the days of which I write to drink tea and coffee from the saucer, which was replenished from time to time from the cup at its side.

The country store of the early days was the source of supply, the cummunity gathering place, and, usually, also the postoffice.

Many articles of merchandise then common have disappeared: powder and shot, bar-lead for bullets, bed cord, tin fruit cans, sealing wax, candle moulds, plug tobacco, snuff, yarn, calico, carpet chain, and so forth, will be remembered by the older people; but the younger generation has not seen and cannot visualize them.

The horse-rack outside; the "up-on-block" from which the horses were mounted; the side-saddle for women, and the long riding-skirt they wore, seem strangely out of keeping with the present mode. Riding double would look odd today, and especially would the people laugh to see a young man going to a party with his girl sitting sidewise on the horse behind him, with her arm around him to hold on.

The bank-barn was almost universal in those hills. It was an easy way to make a warm stable for the stock. An area would be excavated into the hillside, and a foundation wall built of stone, which was plentifully scattered about. This formed the first story, and its top was on a level with the ground at its back part. The superstructure was built on this, and both stories had thus an entrance on the ground-level. Some of the houses were built in the same way. The basement thus afforded warm storage in winter and cool storage in summer. The

spring-house was the most common place for cool storage of the dairy products, and a few of the more progressive farmers put up ice in the winter for summer use.

The old log house in which I lived as a boy on the farm is shown in the accompanying picture. It was torn down years ago, but not before I had obtained the photograph. It was a good example of a house built in the hillside. When I last visited the place, two years ago, the other buildings had also disappeared.

Dreary and lonely as it was when I first went there to live, it gradually assumed some of the characters of home. From a spring on the opposite hillside, we carried water for use in the house. One day I stepped over a copperhead in my bare feet. I stopped and killed the snake, as I had killed many of its kind. Thereafter I was more careful to look where I was stepping. Somewhat farther up the hollow was a spring of cooler and better water at the root of a beech tree. Here we filled our jugs to take to work with us. In the bark of this old beech many names were cut, and they remained there, still legible, when I last visited the spot. In this valley we grew almost all kinds of grain, and a small patch of tobacco for home use.

I used to roll cigars for the men and boys, but did not smoke them myself. I could never bring myself to believe that it was manly for boys to smoke, and believe now that it blunts the faculties of the young and interferes with mental development. After fifty I began to smoke an occasional cigar.

Both old men and women smoked their pipes in the early days, and do yet; but for a girl or young woman of that day to smoke would, in the estimation of everybody, place her in a class where she would the least want

My Home on the Farm

Facing page 28

to belong. Society now seems to have placed the seal of approval on this universal habit; yet, I do not like to see women smoke.

Uncle Henry's house comes to mind like a dream from the past: situated in a little cove near the top of a ridge, it was built into a hillside, with stone basement, after the manner of its day. The road ran along above it. Across the road was a spring, a few feet above the level of the road. Below it, at the roadside, was the milk-house, and from it ran a wooden trough from which the water fell in a little stream into a large watering-trough hewed out of a log, where the passing teams would stop for the horses to drink. Across the road was a large willow-tree, whose grateful shade protected this resting-spot. Above the spring was a grove of red-heart and black-heart cherries,—the envy of the populace for miles around, and all might help themselves for the asking. The winding road, the outbuildings, and a wonderful landscape looking out toward the morning sun complete a picture that the reader may not see, but to me is one which stands alone among the visions of later years,—and I have traveled much. All is changed today. Little is left to resemble the mental picture of a half-century ago; and when I visit the spot I do not tarry, but hasten on, mentally lost among the fading memories of boyhood.

THE OLD LOG CABINS[1]

They stand in the meadows all alone and forlorn,
The log cabin homes where our fathers were born;
The thistle and goldenrod grow 'round the door,
And cover the hearthstone so cheerful of yore.

The chimneys have fallen, the roofs sunken in
The squirrels dart through with their chatter and din;
Unheeded the winter winds whistle about
And the snowflakes drift in where the children looked out.

How thick grew the forest afar and anear,
When these log walls were raised by the brave pioneer.
And a journey to mill was not made in a day,
And a trail through the woods was the only highway.

Here he brought, all undaunted, his pretty girl wife
With her dowry of courage to start them in life;
Here the children were born, oft a dozen or more
And she rocked them to sleep on the rough puncheon floor.

The loom rested here, and the wheel was nearby,
And beside it the tub with the butternut dye;
The settee was there by the warm chimney side,
And the trundle-bed pushed 'neath the four-poster wide,

Ah, well, thus they lived, and they lived long and well
And happiness deigned at their hearthstone to dwell,
And their sons and their daughters have risen to stand
In the halls of the mighty all over the land.

Are you lonely, old cabins, so dark and so drear,
Left alone to the tempests for many a year?
Or, are you content, 'mid the suns and the snows,
To dream away time in a well-earned repose?

[1] Author unknown. Quoted from the *Writings of A. J. Waychoff*, in the *Democrat-Messenger*, Waynesburg, Pennsylvania.

II

Recollections of Boyhood

The usual amusements of boyhood were mine to enjoy, so far as the limited means made possible. The different games of ball and marbles were favorite pastimes, though to play the latter "for keeps" was not permitted, as it was "gambling." The ball with which we played was made of yarn,—sometimes covered with leather. Many a time have I unraveled an old woolen sock to get the yarn to make a ball.

The frosts of fall brought the nutting season. We could not wait for the black walnuts, butternuts, hickory-nuts, and chestnuts to fall, but knocked them off with poles or with clubs, which we threw at the heaviest-laden limbs. In beating down the chestnuts, we were usually serenaded by the raucous tones of the jay-birds, which contested with us the possession of the nuts.

We hulled the black walnuts, and our hands were black with the walnut stain for a week at a time. The flavor of the walnuts was better when hulled while they were still green. The supply of nuts was stored away, to feast on during the long winter evenings around the fireside. Cider, apples, nuts, and popcorn constituted the evening refreshment around the fire. We usually went to school with our pockets stuffed with apples, nuts, and parched corn.

I well remember the first wagon I had, a strong, cumbrous, four-wheeled affair with solid wheels, a bolster,

king bolt, etc., which was made by a neighboring wood-worker and cost my grandmother forty cents. My nut-gathering was thus greatly facilitated. As winter came on, the ice was eagerly looked for, and we got on it often before it was strong enough to bear us up. I had no skates, as we could afford none. It was said that one of my uncles had thrown a pair into an old loft, and I ransacked that place several times in vain effort to find them. I learned to skate on a borrowed pair belonging to one of my playmates, whose magnanimity prompted him to share his pleasures with me. I attempted to make a pair of skates out of wood, and succeeded fairly well; but the tin covering of the wooden runners did not last long. I also remember my first sled, made and presented to me by an uncle.

Sliding down those long hills on handsleds was a winter sport that was thrilling at times,—guiding them with projecting feet, avoiding ditches, steep banks, and other obstacles.

Boyhood will find its pleasures and use the means at hand for its enjoyment, and it is doubtful if the children of the rich get any more fun out of their play than do the poor, who cannot buy, but must create their own equipment.

In summer there was a swimming-hole, which was also the fishing-hole. The soil of that country is a gray clay, and the streams are always turbid. In early days they were full of fish,—perch, catfish, suckers, and other varieties. Those named were edible and much enjoyed by the natives. We would sit along the bank with a half-dozen or more poles stuck into the bank, extending out over the water, with line and baited hook attached. The fisherman would watch these lines intently for evidences

of a bite, and at the proper moment would jerk up the pole and, sometimes, a fish. If we caught two or three suckers in a morning, we would walk proudly home with the catch on a string.

In this north country the fisherman almost feels disgraced to catch a sucker. The muddy streams running into the lake literally teem with this variety of fish in the early spring. They can be caught by the wagon-load with a seine, and are used sometimes as a fertilizer. The clear streams have trout, which are eagerly sought by fishermen.

I have mentioned the ledge of rocks bordering the creek at the edge of the village. They jutted out in places with a sheer drop of fifty or sixty feet to the water below. At some points they took on peculiar formations. One was Porch Rock, from which, tradition says, a settler in the early days, being pursued by the Indians, jumped off and ran a mile up-creek to the fort, thus escaping. Another ledge had caves in it, and was called Easter Rock. In these caves the boys would go on Easter day with a supply of eggs they had saved up for the occasion, and there cook them and have a feast. It was a custom for the boys to watch the hens' nests, take the eggs, hide them, and bring in the hoarded supply on Easter. For once in the year they had all the eggs they could eat.

Another big rock had fallen from its moorings some time in the distant past, and lay with its edge in a deep hole, making thereby a favorite spot to fish. In the lower edge of this rock was a notch that at a distance resembled somewhat the outlines of a human head. Being dark, it was called Nigger Rock. It took both hands and feet to

climb the bank between the rocks. Thus, the picture remains indelibly impressed in my memory.

There were the ball-games and the various sports of our own invention, and the prospect of the apple-and-nut-gathering in the fall. To steal apples seemed to be a legitimate privilege of boys, and many narrow escapes did we have from irate farmers, who resented our intrusion into their orchards. Squirrel-hunting was a great sport, and the squirrel pot-pie was, we thought, a dish fit for kings. My first experience in this line was going along with the older men to carry the game and chase the squirrel around the tree when it was sighted, so that the marksman could get his shot.

I finally concluded that I ought to play the rôle of a real hunter, so stole out with the gun one day, and proudly brought home two squirrels of my own shooting. I did not know what penalty would be meted out to me for taking the gun without permission, should I return empty-handed; but fortune favored me at the expense of the poor squirrels. Squirrel-hunting was the chief hunting sport in those days, and it was remarkable what skill those men of the hills acquired in seeing a squirrel clinging close to a limb in the top of a tall tree and bringing it down with a rifle shot. Nearly all the settlers and the men I knew when a boy were good marksmen, and the shooting-match was one of their diversions.

The shotgun was sometimes used; but the real sportsman used the rifle for still-shooting, while the shotgun was reserved for wing-shooting of pheasant and quail and for rabbits on the run. The muzzle-loading rifle, with its long barrel, was a part of the equipment of every household. The powder-horn and the bullet-pouch were necessary adjuncts. The use of these guns,

the successor of the flint-lock, may seem odd today in contrast with the modern magazine rifle, with its fixed ammunition.

Powder was poured into a small measure, then into the muzzle; a small greased rag was then placed over the bore and the bullet pushed down into the breech with the ramrod, which was then replaced in its groove in the stock under the barrel. A percussion cap was then placed on the nipple, or tube extending into the interior of the breech, and the gun was ready to be fired. There were two triggers, a set and a hair-trigger, which required but a slight touch to release the hammer after the gun was cocked.

It is evident that it was important to make the first shot count, for before the gun could be reloaded the game might be far away. These rifles used spherical bullets, moulded by the hunter himself. The bullet-ladle and mould were also a necessary part of the paraphernalia belonging to the rifle.

The powder-horn, which, as its name implies, was made from cow-horn, the tip drilled out and the butt-end plugged with wood, made a safe receptacle for the powder, and on account of its double curve, hung easily about the body when suspended by a strap over the shoulder.

The equipment for the shotgun was improved as time went on; the powder flask and shot-pouch were fitted with measures on their muzzles, ingenuously contrived. Fixed ammunition in shells has relegated these contrivances to a place among the things of the past, the breech-loader having supplanted the muzzle-loading type.

In winter we boys supplemented our game-hunting with that of fur-bearing animals, trapping or digging them

from their burrows in the hillsides: the coon-hunt and the "possum"-hunt at night, with dogs, and sometimes tracking in the snow a skunk to its lair, which was generally a hole in the ground,—then digging it out and catching it by a steel trap or a "dead-fall," the latter being a flat stone raised on one side and supported by a set of triggers made of wood and arranged in the form of the figure four. The bait was attached to the long trigger extending well back under the stone, and when the luckless animal went after the bait, the trap was sprung and fell, crushing its victim.

We got our spending-money by selling the skins of the fur-bearing animals, and the odors we carried about with us after handling them often caused us to be ostracised for a time from all decent association. The boy of today cannot imagine the efforts put forth or the hardship undergone by the boys of our day to get a quarter or a half-dollar to spend as they pleased only, sometimes, to have this little treasure appropriated by our elders, who thought they needed it more than we did.

The farmers kept one or more fox hounds, and the fox-chase was an infrequent event of great sport. A fox would be caught in a trap, then shut up until the event could be heralded throughout the neighborhood, when the neighbors would gather, with their dogs, for the chase, some on horseback and others assembled at various vantage points, where they could see the chase. The fox would be let out and started in a chosen direction. The way the beautiful animal skimmed along so gracefully over the ground, leaping fences and ditches, filled one with admiration, pity, and the hope that the dogs would not catch it.

After it had been gone a few minutes, and was well

out of sight, the yelping pack of hounds would be let loose and, amid a great din, would set out after the fox, guided by the scent. The horsemen would gallop after the hounds and those on foot would scurry to the hills to watch from a vantage point for an infrequent glimpse of the chase. On those hills it did not take long for fox, dogs, and riders to get out of sight. Then those behind anxiously awaited the return of the hunters, to learn the result.

The fox was sometimes caught, and sometimes found a hole into which it could escape from its pursuers. As a substitute for the fox-hunt, we sometimes took a "drag," as it was called,—a piece of meat, or an old boot partly burned, which was dragged by a cord over the ground. The hounds would follow this trail, giving us a sport only secondary to the real fox-hunt.

Many of the farmers kept bees for the honey they produced. Instead of the present-day methods of getting the honey, the bees were killed by burning sulphur under the hive, when it was filled. Then the entire mass of honey was taken.

The swarming of the bees was an exciting event. The young generation would leave the hive in a mass and light on the limb of a tree until they were ready to migrate; and, if not at once put into a new hive, the entire colony would fly to a hollow tree in the woods. The finding of a bee-tree and cutting it down at night was a sporting event, much enjoyed by the men.

III

On the Farm

After our trip to Illinois, in May, my sister and I returned to our former home in Pennsylvania, in October, and were placed with a daughter and a son of an uncle who was our guardian; my sister with the daughter, the wife of a country doctor, and I with his eldest son, who was a farmer. Then began my life on the farm. The saddest hours of my life were when I parted company with an aunt and her son, who had accompanied us from the west. It was the beginning of a new epoch in my life. The spot where I last saw them I well remember, and I have often visited it. The moment when I said good-bye to them and turned back to that lonely log house in the valley, which was henceforth to be my home, seemed the breaking of the tie that bound me to all that was near and dear in this world. Naturally of a sensitive and sentimental nature, I felt my isolation and loneliness, and many a night cried myself to sleep.

Gradually I accustomed myself to the new order of things and became a part of a family, which was struggling along under difficulties that to them, then, were real, but which I now see as uncalled-for and unnecessary.

It became my lot to do everything that was done on the farm, except milk the cows, which then and there was woman's work. I did everything else, from tending

Portrait of Myself at Eight

Portrait of Myself at Eighteen

Facing page 38

the babies to currying, feeding and harnessing the horses before daylight in the morning.

The house in which we lived was a hewed-log structure, with a kitchen of sawed lumber. There was a huge fireplace, which was the sole means of heating. A large log would be drawn in on a sled and rolled into the fireplace as a back-log, to throw out the heat and to help keep the fire alive through the night. Wood of smaller dimensions was piled against this log in the long winter evenings and the family sat around in a semicircle, waiting for bedtime to come. The side of the body next to the fire would be uncomfortably warm, while the other side was freezing. It was, therefore, necessary to change one's position often in order to keep comfortable. Sitting astride the chair, with head resting on the arms crossed on the chair-back, was a favorite position with the men. A position that I often took was sitting on the hearth, back to the jamb, with the flickering firelight on the book I was reading. I listened to many stories and much folk-lore while sitting around this fireplace, and doubtless shaped my course, in no small measure, by the guide-posts thus set up, though the following was not always the best way.

Besides my school books, there were three other books in that house, one of frontier Indian tales, one *Pilgrim's Progress,* and another, whose title I have forgotten, an uninteresting one which I did not read. How often have I regretted the paucity of reading matter of those days. Today my table is covered with books, magazines and other readable matter, which I do not have time to look at. Of course this wealth of periodical literature did not exist fifty years ago. The weekly newspaper came once a week, when we walked across the hills two miles

to get it. How different from today. Bedtime came early, as we were to get up in winter before the coming day, and at dawn in summer. Then, with little preparation, we jumped into bed,—like an ice-bank in winter, which was gradually warmed by the body heat; and one lay still while this warming process was going on.

Feather-beds were in vogue, and the slat-bed was beginning to take the place of the cord-bed of earlier days; though many of the latter were still in use. Before the dawn, the household was astir, to breakfast by lamp or candle light. The kerosene lamp was coming into vogue. Corn was our cheapest food; so it was corn or buckwheat cakes for breakfast, pone for dinner, and mush-and-milk for supper. Other articles of diet were generally added, and one could not complain of the quantity or quality of food served.

While breakfast was being prepared, I was sent to the stable to feed, curry, and harness the horses and clean out the stable. In muddy times (and it was generally muddy in winter), this process of currying and rubbing down the horses was no trivial matter.

After breakfast it fell to my lot to wash the dishes before starting off on my mile-and-a-half to school. The same duty devolved upon me after supper. The wood-pile was a creation of logs, hauled in from the woods, and the cross-cut saw, axe, maul, and iron wedge, with several dogwood gluts, were the implements by which these logs were worked up into pieces one could handle. The logs were handled with hand-spikes as the canthook is used today.

Oak and hickory wood was the favorite fuel. The soft woods were not in favor. In winter the fire was never permitted to go out. The partly-burned embers

were drawn together against the back-log and covered with ashes, so, in order to renew the fire, it was only necessary to stir the pile in the morning and apply some kindling to the live coals.

When necessary to start a fire, block-matches were used. These are not seen today. They were the old-fashioned sulphur matches, and were used sparingly. For lighting the pipe, lamp, lantern, or candle, small rolls of paper were used, a jar of them usually resting on the mantel, and, when used, were lighted in the fire. It was a common practice for neighbors to borrow fire, and carry home a shovelful of burning coals, there to fan them into a flame either with a hand-bellows or by getting down on all fours and blowing them with the mouth, —a good exercise in deep breathing.

The ashes of oak and hickory wood were carefully taken from the fireplace, stored in the ash-house, and at soapmaking time were placed in a wooden hopper made of clapboards and lined with straw. The bottom of this hopper was a hewed trough. Water was poured into the ashes, and soon a dark fluid potash lye would percolate through. This was placed in a large iron kettle, with scraps of fat saved for the purpose, a fire was built under the kettle, and, as the mixture boiled, the fat was slowly dissolved. Soft soap was the result. The lye thus produced was also used in the making of hominy, one of the food products from corn.

With the advent of spring, came the sugar-making. The great sugar-maples, which were scattered over the farm, or were in groups, which became known as the sugar-camp, were tapped with three or four holes bored through the sap-wood. Into these holes were driven hollow tubes,—or spiles, as they were called,—usually

made of elder stalks. Through these the sugar-water ran, dripping into pails or sugar-troughs, which were made by splitting poplar logs about three or four feet long and then cutting out the flat side with an axe, until a vessel was made that would hold two or three pailfuls. Out of season, these troughs were turned upside down against the tree. The sap was collected once or twice a day and hauled or carried to the central boiling station where, in vats or large iron kettles, it was boiled down to syrup, or further evaporated into a thick paste, which, if stirred while cooling, became granular maple-sugar, or a solid mass, if left to harden without stirring.

"Sugaring-off," as it was called, was often the occasion for a party; and the hot, pasty sugar dropped into water made a most delicious confection. In this way the early settlers got their sugar; or, as a sweetening agent, sorghum was made from the juice of cane in the fall. The cutting and crushing of this cane, and the boiling down of the juice into molasses, was a procedure I have often assisted in.

We boys went barefoot most of the time in summer. In these days of broken glass and cast-off tin cans, it is dangerous to go barefoot. Then no such hazards awaited us. The stone-bruise and the stubbed-toes contributed to our miseries. In harvest time, when the running briers, stubble, stones, and clods made walking difficult, we wore boots. I usually had a pair cast off by some of my elders, and as they did not fit, the skin was being continually rubbed off my feet and ankles, so that it was a relief to take them off and take my chances in bare feet. In the fall there would be a beef-hide or two that had been tanned, and we would go to the shoemaker and have pegged-boots made for the winter. If we were fortu-

nate, we had a pair of fine calfskin boots for "dress-up" occasions. The boot-and-shoemaker was a necessary factor in the pioneer villages. His shop was a favorite loafing place as, with curious eyes, we watched him fashion, sew, and peg footwear, or put on patches and half-soles. Later we bought ready-made boots. They had tops reaching nearly to the knees, while the trousers were folded over at the ankle, with the boots drawn over them. To remove them at night required the bootjack,—a familiar object in every chimney-corner. One could not wear ordinary shoes in winter, as we were continually going into mud or snow over their tops. When I was a small boy, a pair of boots with red leather tops and copper toes was my proudest possession.

The weekly arrival of the huckster was an event. With his covered wagon and four horses, he passed over a regular route, collecting the farmers' butter and eggs, and trading coffee, sugar and other kitchen necessities for them. He sounded his trumpet when a half-mile or so away, and the notes reverberated through the hills,—a pleasing break in the monotony of those hills and valleys.

Three important events in the fall were: the making of cider and apple butter; butchering the hogs and curing the meat, and the making of the year's supply of soap. Other events were often made the occasion of frolics; the grubbing-frolic, the log-rolling, the barn-raising, the rail-splitting, the corn-husking, the apple-cutting, etc.

If a piece of wooded land was to be cleared, the neighbors would gather in, on invitation, and in formation would attack the smaller growth with grubbing-hoes, piling the brush in neat piles. The trees and logs would be the occasion for a rail-splitting; then a log-rolling,

and many feats of strength were thus occasioned. At night there would be a party. A feast would be spread out, and then the women and girls would have joined the party, and the neighborhood fiddler would supply music for the "hoe-down," quadrilles, and other dances, until a late hour, when all would take to their several homes. Sometimes, in ultra-religious quarters, dancing would not be permitted; and then many interesting games were played, some of the folk keeping time to the music with their feet. Any of these games were a poor substitute for dancing, but they lost their satanic character if not called dances. The credulity of the people in religious observances still remains one of the vagaries of human nature. The corn-husking, whether in the barn or the field, was one of the exciting events; and every frolic of whatever kind had its champions, and the skill of the contestants comprised the main topic of conversation. At that season the husking-peg of wood, bone, or iron kept company with the jackknife in our pockets.

Of the evening parties in which both sexes took part, the apple-cutting was perhaps the most exciting; and it may have followed a quilting-bee held by the women in the afternoon. Apples were pared, quartered, and strung on strings, to be hung up around the kitchen fire, so that dried apples might serve in place of fresh ones out of season.

Women seemed especially to enjoy the quilting-bee, when the flowered and many colored calicoes were cut into small pieces and fashioned into artistic shapes and sewed together to form the top of the quilt. A bottom sheet of plain cloth formed the underside, and a layer of cotton batting was the interlining. This combination was stretched on a frame resting on the backs of chairs, or

suspended by ropes from the ceiling, and worked from the sides,—the side-bars of the frame being rolled inward as the sewing progressed.

The workers sat around the four sides and sewed this creation through and through until it was so closely seamed with stitches as to make a bed-covering of great warmth and durability. The housewives vied with one another in producing these artistic bed-coverings, which today exist mainly as curiosities. The patches were usually worked into some definite formation, sometimes haphazard, thus making the "crazy-quilt." These various social gatherings were pleasant breaks in the monotony of frontier life and form a favorite topic of conversation today among those who remember and took part in them.

The women of those days occupied their time at social gatherings, such as quiltings, doing something useful with their hands while they detailed the community gossip, much the same as their descendants of today do over the card-table, merely killing time. Ghost stories, tales of witchcraft, the comings and goings of their neighbors, thrilling experiences, and similar topics added spice and variety to their mental gymnastics while they made articles needed for food, comfort, or home decoration.

Stories of ghosts, haunted houses, signs, and like superstitions made a deep impression on our young minds and it has taken a lifetime to eradicate them from mine. The phases of the moon were given much credence in many of the activities of the old people. Planting, harvesting, and so forth, must be done when the moon was right and certain days and conditions of weather were propitious, or otherwise, for certain social activities.

I well remember the many places about which we had

heard stories of ghosts and "hants," which, on that account, we feared to pass at night, and in doing so, or when passing through a dark woods at night, we would whistle or sing or talk to ourselves out loud, in order to bolster up our courage. The weird sounds of nocturnal birds, animals, or insects only added to the morbid effect on our minds, in which had been planted the seeds of superstition and the dread of the unseen. The chirp of a cricket and the hoot of an owl (when I hear them) bring back vividly the impressions gained in childhood. Thanks to a more enlightened age, the children of today do not have these superstitions inflicted upon them. Figuratively speaking, the voices of Nature are music to them, while to us they were weird and ominous noises.

Many of the drudgeries of those days were made pleasant pastimes by the custom of getting together the neighbors of the community and doing a thing collectively that would be long, hard labor for the settler to do alone. Roads were worked in this way, and the poor excuses for highways which threaded our country were kept up in this way, the farmers getting together once a year and "working out their road tax."

The log houses of that country had been built in this way, and the custom gave way slowly to modern ways. The methods of clearing land were crude. The hardwood stumps were deeply and densely rooted in the soil, and to get them out of the way was a most laborious task. We knew nothing of dynamite, and no effort was made to blast them with the only blasting-powder then extant,—the coarse black powder of the coal mine.

To plow among these stumps was the hardest work known to the early farmer. Oxen and mules were preferred to horses, as the latter moved too fast with the

plow through the rooty soil; and, when the plow was suddenly stopped by a root too strong to be dislodged, the plowman was jerked suddenly against the plow-handles, if not thrown clear over them. These plowmen developed some of the most expressive strains of profanity.

After the new ground was plowed, about one-half the area had been broken; then we must take a grub-hoe and dig up around the roots left in the ground. The roots that had been torn out were cut off and gathered into piles, to be burned when dry. Such an area looked anything but a promising future corn-patch; but as time went on, each succeeding season's plowing would remove more roots, and if the stumps were kept from sprouting, the clearing in a few years became a field instead of a woods.

I have vivid recollection of these efforts to bring under cultivation the sides of those old Pennsylvania hills, and I know there are many who may read these pages who have had similar experiences; for they were common in those mountain and hill regions, which, in the early part of the last century, were still on the borders of a civilization that was filtering through and passing toward the west.

Timber was so plentiful that little account was taken of its possible value in the future. If it served the needs of the time, that was sufficient. Some of the finest oak, walnut, and other woods were freely sacrificed to make the rail fences that bounded the fields. Those old worm-fences still stand in places, a curiosity to the tourist, who knows little of how common they were before the board and the wire fences of today came into use.

The rails were laid upon each other in a zigzag fashion

to the height of about six to eight rails, held in place by their own weight, and if complete, had a set of stakes on each side of the angles crossed at the top, making a fork for another rail (the rider) to rest in and lock the structure. When these stakes were dug into the ground, the fence thus completed made what was called the "stake-and-rider fence," which was strong enough to resist almost any force that could be brought against it.

We have heard in recent years of agents going through these hills, buying up old black walnut and oak rails to be used in the manufacture of furniture. We are not materially different today from those old settlers of the hills, for we value least what is about us in greatest abundance.

The line-fence was often a matter of controversy of more or less intensity between neighboring farmers. It seems strange to us who live in the west, where land is described by section lines, to remember that in western Pennsylvania land holdings had no definite geographical outlines, but were of almost any shape, except circles. They were located by metes and bounds, and were described as so many rods and perches in a certain direction, to be indicated by the compass from some fixed point, such as a stone or a tree, to another point marked in a similar manner, then, at an angle either acute or obtuse, to another similar point, and so on until the whole area was enclosed. These fixed points were liable to become lost by the removal of the stone or the death of the tree, and there were sometimes different interpretations given by different surveyors, so they became very busy as the country settled up and the pioneers laid claim to their own.

Land was always measured on the level, so the settler

on the hillside naturally had more land surface than his neighbor on the flats. The settler in the valley had an advantage over his neighbors above him on the hillside, for, as the forests were cut away, the rains brought the soil from the hillsides to the valleys, until now many of those old hillsides, once a dense forest, are barren shale, bearing only cinquefoil, pennyroyal, and other useless weeds. The land descriptions of these old hills will be an interesting study to future generations who compare the pen sketches in the old records with the blue prints of today or the aeroplane maps of the future. It required a good working knowledge of geometry to compute the amount of land in one of these many-sided areas; but then, good mathematicians were common in those days. Education was not confined to the three R's, as many suppose; and while the field of learning was greatly circumscribed in the early days, the study of limited subjects was greatly intensified thereby.

Harvest time in the hills was an outstanding event of the year. Where the hillsides would permit, a reaper was used, one that accumulated a sheaf of grain on a platform and cast it off at intervals,—to be bound by hand by a man following.

The act of binding by hand a sheaf of grain must be seen to be appreciated. When the grain was long, a single wisp of straw was sufficient; but when the straw was short, it was a neat trick to grasp a handful of straws near the top with one hand and with the other divide the bunch into two parts, then, by a quick motion, make a half-knot, whisk it around the sheaf, twisting and tucking under the butt ends, then cast the sheaf to one side,—an operation that could be done twice while I am writing

it once. This art is lost, since the self-binder has come into use.

Where the hillsides were too steep for the machine, the grain was cut with a cradle,—a framework built above a large scythe, which caught the grain and held it until, at the return of the sweep that cut it, the grain was laid in a swath at right angles to the path of the reaper, to be raked and bound by hand as before described.

Skill was required to swing one of these cradles. While on the farm I grew in size and strength so that I could swing one of them, and helped cut many a field of grain.

Shocking was the next process. The sheaves were gathered together,—a dozen or so,—stood on end and capped by two sheaves; spread out double, fan-shaped; bent over, and placed over the top of the shock. When well-capped, these shocks would shed rain very effectively. They were later hauled to the barn, or stacked outside, to await the coming of the threshing machine, which made its circuit among the farmers. The stacking of grain required skill to make the shocks shed rain and prevent dampness, with consequent moulding or sprouting of the grain.

In southern Scotland and northern England I have recently found stacks of grain standing some years to preserve the grain, which, due to the moisture in the air, will mould in granaries but will keep indefinitely in a well-thatched stack. In early days, when only small areas were planted, grain was cut with a sickle,—a miniature hooked scythe with a handle,—one hand grasping the grain while the other hand cut it with the sickle.

In 1921 I saw this primitive method being used in Belgium, where areas of grain are too small for ma-

chinery. From the sickle, flail, and windmill is a long jump to the modern machine that cuts and threshes grain at the same time; but such a machine could never have been used on our hills.

Threshing was an important event after harvest. Threshing-machines were owned by men who served a section of the community as large as could be covered in a season.

These early machines were interesting. They were driven by horsepower before steam came into general use. Setting up one of these machines was as interesting as raising a circus tent. The machine would be placed, leveled, and staked down. The horsepower was a large-geared wheel with four sweeps attached, to each of which two horses were hitched.

The driver stood on a platform in the center and drove the horses, which went round and round. His job was to deliver a steady power to the machine. The power was transmitted by the tumbling-rod,—a long jointed shaft, the curves being provided with "knuckles," or universal joints, as we now know them.

The machine was served by a pitcher to throw the grain from the stack; a band-cutter; a feeder; and a man to measure the grain as it came from the spout, with a boy to hold the sacks. Then there was a stacker, and another man to fork away the straw from the chaff. This latter was the most disagreeable job of all, for one had to breathe the dust and get his clothes full of beards from the grain, giving a most uncomfortable sensation.

As the neighbors usually gathered in to help with the threshing, thus exchanging labor, they worked in relays, so the work went along systematically. Threshing-day

was usually a feast day, as were most of the occasions when the farmers got together to help one another out.

One of the farm duties was to go over the pasture fields after harvest and cut the briers with a scythe. The fields would become rapidly covered with briers if they were not cut at least once a year. As a boy I was expert with the scythe, and on one occasion was employed by a neighbor to trim up his fields. I worked six days at the job and received forty cents a day, or a sum total of two dollars and forty cents. I felt rich in possession of so much money, and doubt if I have ever since received a fee that seemed so large to me.

I should not want to relive this part of my life; yet I am glad to have seen and known of so many of the customs of people who lived in the first half of the past century, many of which customs still existed during my early life, and in many of which I took part.

As I review the past while re-reading these pages, numberless scenes come anew into the perspective of the picture. One of my favorite occupations in spare time was to climb to the highest peaks of the hills and gaze musingly upon the scene below. I often looked wistfully at the range of blue mountains that skirted the southeastern horizon for a quarter of a circle, and wished that I might some day journey to their summit and view the landscape from their lofty height. The time came when this wish was gratified; and as I gazed on city, village, and hamlet, field, forest, and stream that lay spread out before me like a panorama, it was difficult to realize that I had passed through this picture to reach my point of view. How typical of life,—to keep our eyes on the goal; to keep toiling toward the summit, unmindful of

the many pleasures we might have enjoyed while on the way.

Not far from the mountain-top from which I viewed the landscape when a boy, is the grave of General Braddock. General Braddock had been shot through the body and had died a lingering death three days later. The army had retreated to this point at the time of his death, and he was buried in the road, in order that the passing of the army over his grave might obscure it from the pursuing Indians. A concrete highway passes here, now on the old Cumberland trail.

IV

Woodcraft

In an isolated country, thickly wooded with splendid trees of oak, poplar, and hickory, tall trees straight as arrows, and clear of limbs for fifty feet or more, that would split true, the hardy settler with his edged tools found ample play for his craftsmanship. He must hew the logs for his house; split out the puncheons for his floor; rive and shave the shingles for its roof, and fashion everything that went into the structure. The latch and the hinges of the door must be carved out of wood before the blacksmith, with a meager supply of iron and steel, began to fashion parts to serve where strength and durability were needed. When he came with his steel, he became the toolmaker, as well as the maker of implements of iron.

The settler having selected a tree for his purpose, sized it up, noted its leaning, and decided where he wanted it to fall. With his keen axe he began cutting a notch in the side of the tree toward the direction it was to fall. After reaching the center or beyond, he changed to the other side and chopped a corresponding notch, continuing until the top began to move; then, by carefully directed strokes, the tree was drawn so as to fall exactly where wanted. The long trunk was measured, the limbs trimmed off, and if the settler had a cross-cut saw and a helper, the tree was sawed into lengths desired; or, with his axe, he stood upon the trunk and chopped it into

the lengths needed. If it was timber for house or barn, he might want to hew it to size. He would take a chalk-line, soak it in a dye,—Venetian red, generally,—fasten it at one end, then draw the line taut from the other end with one hand and with the other lift the line and release it, to strike the log with a snap, leaving a straight red mark from one end to the other. He then took his place, standing on the log, chopping and splitting off the slab, then scoring the surface with numerous axe-cuts. The log scored, he took his broadaxe, a huge flat affair with a cutting edge a foot long and a short handle set at an angle to the flat of the axe. With this tool he trimmed the face of the log smooth, then, measuring the thickness desired, he treated the opposite side of the log in a like manner, and he had a log faced on two sides. In the same way he hewed the two other sides, if he wanted a square timber.

These logs were dovetailed or notched together at the ends, set in squares, and the walls of the structure gradually rose to the required height, cut to fit, and then clay mud was plastered in to complete the closing process. Thus did they "chunk and daub" their log houses to keep out the cold. Doors and windows were provided; but as few as possible. In my day, glass was procurable for windows; but in the earlier times, I am told, the window openings were covered with greased paper, which would admit a little light, but, of course, could not be seen through. The hewer became very expert with the broadaxe, and his finished work was almost as smooth and regular as if it had passed through a saw-mill. Should he want to make shingles, or clapboards, the tree was sawed into shingle cuts; these were stood on end, split into bolts, and, with a fro and mallet, these were further

split and rived into thin boards, which were then placed on a shingle-horse, where they were held securely by a locking device handled with the foot, then shaved with a drawing-knife to the proper size and thickness.

Oak shingles thus made,—some thirty inches long, four to six inches wide, and a half-inch thick, shaved thin on one end and one edge,—made a durable roof, but one that would allow the snow to blow in, in winter, so that those who slept in the loft often had a covering of snow added to the quilt or feather-tick on the bed.

Clapboards, though made in the same manner, were longer than shingles and were shaved to uniform thickness. Shingle-making became an art with some of these pioneers, and some of them specialized in it, sometimes taking on a side line, such as rail-splitting. It fell to my lot when a boy to be a helper to one of these specialists. He was a most interesting character and used absolutely perfect English in his conversation. He had been educated in the law, but for some reason had taken to a humbler pursuit. He was a giant in strength, and to pull a cross-cut saw opposite him required greater muscular power than I possessed, and my lack of vigor called forth from him at times some choice profanity. I came in for more of such comments when turning the grindstone for him, to grind his axe or drawing-knife. He bore on with such weight that I could hardly turn it, whereupon he would say: "Can't you apply a little more physical force to the grindstone?" I learned something of his art, and also split and shaved shingles myself. Later I punched and nailed them on the roof with the old-fashioned cut nails. The shingle punch was an interesting implement, but it has disappeared with the shaved shingle.

The "specialist" to whom I have just referred was most interesting to me. He could recite history like a book, and as a mathematician he had everyone else in the country beaten. I learned much from him. He was a man of great energy, both mental and physical. I lived for a time in the same house with him. He was an early riser, and I well remember his jumping out of bed and starting for the stairway. His clothing consisted of two parts,—shirt and trousers. The upper garment he slept in; the lower he would step into on the way to the head of the stairs. His boots he put on by the fire downstairs. He was without fear, except of thunder and lightning; and would hide away in a cellar, if he could, during a storm.

He was fond of whiskey, and usually kept a jug of it hidden somewhere about the place. There were distilleries in the county, but no saloons, no breweries, and no bars. There was no license for retailing alcoholic liquors in my time, but whiskey could be bought by the gallon at the still-houses, and many an old fellow would make occasional pilgrimages to the source of supply and carry his jug home with him. Ordinary whiskey was bought at two dollars a gallon, or a ten-year-old article at three dollars. My old friend one day had returned from the still-house some six miles away, carrying his jug with him, and reaching town, had accidently dropped the jug on the stone sidewalk, with the result that it broke and the contents ran away. He stood musingly for a few moments; then, to a sympathizing bystander, said, "It is not the cost of the article I care about, but the G—d—inconvenience of procuring it."

Liquor control in those days in that community was much better than we have it today,—no saloons, but a

place where those who must have liquor could obtain it without breaking the law.

The handling of logs was accomplished with the handspike and skid, and when they could not be rolled to a distant point, were skidded up onto a log sled,—a short sled made for the purpose, with a heavy bench, on which one end of the log rested, while the other dragged on the ground. It was held on the sled by two stakes, set in auger holes in the bench, supplemented by a log chain. On bare ground, these heavy logs required a strong team to draw them, but in winter it was comparatively easy, on the snow. Being a hilly country, the grade greatly facilitated the handling of logs, as they were generally moved downhill. The old-fashioned timber-wheel, which carried the log suspended beneath the axle, was occasionally seen. They were for summer use and for long-distance hauling.

Being a hilly country, the hillsides were too steep for wagons; so sleds were used in most farm operations. The construction of the sled is interesting. An oak tree with roots large enough and properly curved was grubbed and chopped down, cutting off the root three or four feet from the trunk, the butt of which was cut off eight or ten feet up. The superfluous wood was chopped away, and the sled-root, as it was called, was taken to the sawmill and ripped to size. The resulting runners were six inches wide and two-and-a-half inches thick, and turned up in a graceful curve in front, forming the nose. These runners were framed together, with knees and benches securely mortised in and braced. On the bottom of the runners, wooden shoes were fitted, then fastened with wooden pegs. They, of course, wore out rapidly, and had to be replaced often. Shoeing the sled was one of

the farmer's odd jobs, so many of which absorbed his leisure time. I have seen these sled-runners cut out by hand, and split with a cross-cut saw,—a laborious task, which could be justified only by the inaccessability of the saw-mill. These sleds were in strong contrast with the logging-sleighs I found in the north woods.

The carpenter and the cooper came early upon the scene; the former to fashion the house in its various parts, and the latter to make barrels, buckets, and various containers, needed in storing or transporting the products of the settlement. The old cooper-shop was also the pioneer's furniture factory and was fitted with shaving-horse, turning lathe, and so forth, all crude and hand-made; but they served the purpose. The split-broom, a product of this shop, was common before broom-corn was raised. Its forerunner was the besom, a bundle of twigs on a handle, which may still be seen in some of the European countries, and is used especially in sweeping the streets.

The blacksmith shop came as the settlements grew; and the village or country blacksmith is familiar in story as one of the attractive features of pioneer life. Here all kinds of useful articles were hammered out, including the nails that were used in woodwork. Here the horses were shod while the waiting horseman pumped the bellows or, in summertime, kept the flies off the horse with a horse's tail attached to a handle. The blacksmith would sing at his work and keep time with his hammer, which struck the bare anvil as often as it did the hot iron. The ring of the anvil was apparently music to him, and heralded his activities to the community about. He made his own horse-shoes and the nails they were put on with. When the shoes were worn so that they must be changed, the old

ones would be hammered together and new ones made of the old. Iron was scarce and must not be wasted. It was interesting to watch him upset or put new steel into an axe or grubbing-hoe or to make knives out of worn-out files. Axes were not discarded so readily as they are today. They were hand-made and, when badly worn, were heated and drawn out to a proper degree of thinness, then tempered and ground to an edge, and the axe was thus made to last for years.

Could the old iron-worker of a century ago look into the modern hardware store of today and see the number and variety of articles that can be bought for a few cents, it would startle him to compare these with the articles he wrought with such tedious labor. But he had his day. He fulfilled his mission, and has left a record of his skill, ingenuity, and adaptability to his surroundings and their needs that is an inspiration to anyone who knew him or his handiwork. These old craftsmen in wood and iron were real men, sturdy and honest, and stood high in the esteem of their fellow-citizens.

In *Local History of Greene County, Pennsylvania,* written by Professor Andrew J. Waychoff and printed in the *Democrat Messenger,* at Waynesburg, Pa., I find the following reminders of the pioneer days and things that were common in our boyhood in that remote country, here reproduced by permission of his son, Challen Waychoff:

Some Things That I Would Like to See Again

I would very much like to see again,—a skillful reaper cutting grain with a sickle,—a fire being started by use of a flint, steel and gunpowder, or tinder. Matches were not used until about 1835 . . . Some old-fashioned trapping in school classes. . . . An old-fashioned spelling bee, as it was later called. . . . A good old log-

fireplace and log-fire therein, with back-log, forestick, dog-irons, poker, wood-tongs and shovel. . . . A nun-bonnet. . . . A pointed cape as worn by older women fifty or sixty years ago. . . . To see some school children "cooning it" across some footlog. . . . A man or woman weaving with a hand-loom. . . . A skilled man or woman carding wool with hand-cards. . . . To see and wear some home-made "linen-woolsey." This was cotton warp and linen woof, as made on hand-looms. The cotton and linen were generally colored of a copperas color. Six threads of each alternating a like number of white threads was the general color and scheme for linen woolsey. This goods did not fade, and was not ugly.

Any of the following: An old-fashioned apple-cutting; a quilting-party; a corn-husking; a log cabin; a flax-pulling; a taffy-pulling; a play party. . . . To hear and see an old-fashioned serenade, the horsefiddles used therein, the roll-calls, etc. . . . To be at a "stir-off" at some sugar-camp. . . . To see an old slab-bench or puncheon-bench used by early school-children. . . . A yoke of oxen at work; a taste of a sugar-egg; to hear some old-time riddles; to see a *United States Spelling Book;* to see a *Western Calculator;* a fancy quilt of long ago; some old-fashioned home-woven coverlets.

Girls shaking the cat in a newly-finished quilt; or, rather, hear the squeals and screams as the frightened cat gets out. It was said that the nearest girl to where the cat got out would be the first in that company to get married. . . . To go with persons "snipe-hunting." . . . To see the old-time flocks of mountain pigeons. . . . To visit the old mountain-tea patch. . . . To see an old-time game of "blackman." . . . To play a game of "antney-over," or "lost button," or "roley-hole," or "cornen-ball," or "louse-house," or "bull-in-the-pen," or "paddle-ball," or "hindermost-of-three." To attend some old-time singing school. . . . To see a woman spinning wool-rolls on a large spinning-wheel. . . . To see and hear a woman spinning flax on a small wheel and to see the distaff. . . . A yankee-jumper, of an old style. . . . To get some good eats at grandmother's. . . . To own an "old grandmother's cloak." . . . To fight bumble-bees as boys used to fight them. . . . To see some people who were called "Old Grannie." . . . To see a "trundle-bed" and sleep on one.

V

School Days

The village school I first attended was a brick building of two rooms; the primary room was divided from the advance-room by large folding doors, so that the two made one large room on special occasions. Advancement from the primary room was determined by progress and was coincident with the passing from the fourth reader to the fifth. This old school has left many dim memories. In it, years later, I taught two terms while preparing for a professional career.

On my removal to the country, I began going to the district school: a little frame building of one room with the old-fashioned wooden desks, each with a seat in front for the desk ahead. Each desk accommodated two pupils, who sat side by side; and one of our eagerly exercised privileges was to select our seatmates, and we always aimed to have our chum sit with us. These old desks were made of black walnut, and were notched and carved with the jackknives of the boys of several generations,—the incisions made when the teacher wasn't looking,—a custom that has grown from a boy's clandestine prank to a duly-authorized procedure, as I had occasion to see at Eton College in England, where the woodwork of the chapel is carved with the initials and names of eighteen thousand students. Expert wood-carvers are employed by some of the students for the purpose.

The Old School House

Facing page 62

The boys occupied one side of the school-room and the girls the other. At the head of the room was a platform, on which the classes were lined up for recitation, usually standing through the exercises, the pupils taking their places by numbers, according to the count at the previous lesson. Rank in classes was attained by proficiency, and it was an honor eagerly sought to stand at the head of the class. A wood blackboard ran across the room, above the rostrum, and on this each worked a given problem in arithmetic, algebra, grammar, or spelling, as directed.

In the center of the room stood the cannon-ball stove, with a supply of soft coal in the scuttle beside it. Near the door was the water-bench, with its pail and dipper from which all drank. To go for a pail of water was a much-sought favor after "books-took-up," for, as a rule, the pupils, especially the boys, welcomed any break in the monotony of study. Of course, it took two of us to carry the pail, and upon its return there were always numerous appeals for permission to visit the water-bucket and drink from the common tin cup, or dipper. At nine a hand-bell was rung at the door by the teacher, or by some pupil who coveted that honor. At ten-thirty there was a fifteen-minute recess, at which we all scampered into the yard and indulged in lively games.

The bell called us to books again, and at twelve the noon intermission began, and the dinner-pails, or baskets, were soon emptied, so that we might get to our play. To books again at one, and recess at two thirty; then at four, school was dismissed for the day.

The schoolhouse was a mile-and-a-half across the hills from my home. I was required to go home promptly and put in the rest of the day and evening doing chores,

which included all the duties pertaining to life on the farm.

School days followed about the same routine as today, but methods of instruction and grading have greatly changed. My teachers I look upon as my greatest benefactors throughout my boyhood and youth; always stimulating and encouraging me to the opportunities and possible achievements of life. I revere the memories of those of them who have passed on and still try to keep in touch with the few who are living.

Much stress was laid on mathematics and language. Articulation and pronunciation, with correct spelling, were in large measure the gauge of scholastic attainment. In spelling exercises, pupils were required to spell and pronounce each syllable separately.

The spelling-school, held usually on Friday afternoons, was an event much enjoyed. The school was divided equally into two "sides," each standing on one side of the room. Words were pronounced by the teacher, and each pupil in turn from alternate sides spelled the words as given. When one was missed, the opposite pupil tried it, and if unsuccessful it was passed back to the next in line on the other side. Each one, as he or she missed spelling the word, sat down. It was an honor much sought to remain standing after the rest had been spelled down. There were some expert spellers, and sometimes the contest was long drawn out. Penmanship was also stressed in those days, and good writers were much more common than today.

For a time I assisted the recording officers in our county court-house in recording court proceedings and other legal papers. The work was all done by hand, with a pen, and great tomes of these records may still

be seen executed with the pen, a most laborious task when compared with our recording machines of today. Adding machines had not been invented, and one needed to be expert at figures to keep accurate records. The typewriter was yet to come into use. How the world has changed in a half-century!

The old schoolhouse served as a sort of community center. In it was organized the fife-and-drum corps, which later became known as Dodd's Band, an aggregation of country boys to the number of twelve, which was equipped with five fifes, five snare-drums and two bass drums, and trained by a man named "Taff" Temple, who could get more music out of a fife than any man I have ever seen before or since. The peculiar trill he was able to make was a most pleasing and inspiring music. It is possible we inherited some of the martial spirit of the Civil War; there was nothing so awakened that spirit in us as the sound of fife and drum.

We built for ourselves a band-wagon, which, with its high front seat and four horses, made quite an imposing appearance as we attended picnics, political meetings, and other public gatherings.

My inspiration to study medicine, I distinctly remember, began one night while attending band practice in the old schoolhouse. I happened to find a book on physiology belonging to one of the advanced students, and was much impressed by the pictures of the human body, especially the skeleton. It must have been the first real picture of a skeleton and chart of the muscles and various organs I had ever seen. They produced a deep impression on me; and in the succeeding days the feeling of dread changed to one of curiosity and a desire to know more about the structure and functions of the human

body. I soon took up the study of anatomy and physiology, and it became my most fascinating subject while in school and during rest periods while at work.

At the age of fifteen there came a climax in my life on the farm. My master, for some insignificant reason, had indulged in a fit of scolding and threats, which led me then and there to leave him. I gathered together my few belongings, consisting of a few clothes and my father's Bible and writing desk,—a small folding affair, —put them in a quilt my mother had made, and tied the corners together. The pack thus made, I slung on my back and started across the hills to my sister's home (she was married then) and settled down to make my home with her. The next day my uncle sent for me, and had me come to live with him. Life became somewhat more endurable, and I remained there for a year.

In the meantime, I was a problem to my uncle and guardian. He was puzzled as to what he should do with me, since I was a superfluous addition to his numerous family. I finally decided to do what my grandmother had wanted me to do, that is to say, learn the carpenter trade,—probably because most of her boys had learned carpentry and grandfather had been a worker in wood.

VI

The Carpenter Trade

In the early spring of 1882 I was apprenticed with Leroy W. Smith and William H. Draden, carpenters and contractors, to learn the carpenter trade. Those were the days when to learn a trade meant a three years' apprenticeship, after which one became a journeyman craftsman, entitled to the rights and privileges belonging to that particular vocation. Nowadays one needs only to be able to saw to a line and drive nails to be a carpenter. Manual training is taught in the schools, which fits one today for carpenter work which is largely the putting together of rough frame-work and fitting in machine-made finish. Very few workmen today would be able to make sash and doors and lay out and construct a winding staircase.

By agreement with my guardian, I was to serve three years. That was the time required to learn a trade. I received, for the first year, seven dollars a month and my board and washing. I served the three years, and was paid eleven dollars per month the second year, and sixteen dollars the third. Service only lasted through the building season, which began with the spring and ended with the fall. I was only paid for the time I worked. I was free during the winter to go to school at Frosty Run,—which, for its day, was quite a center of rural learning. Here it was that I received my common-school diploma,—a most treasured document. I attended two

summer normal terms at Waynesburg College, attained a teacher's certificate by examination, and taught two terms.

My service the first two years at the carpenter trade was shared by Clark McClary. We two were known as the "carpenter's cubs." Clark was a fine fellow, intellectually above the average. He was older than I, and I gained much valuable information from him. He kept a diary, and induced me to keep one also. I look at that old book now somewhat curiously. Its chief topic was the weather, interspersed with goings and comings in our own little world. Clark and I studied physics together. One of our demonstrations was to stand at some distance apart along a board fence; then, striking a blow, we noticed the difference in the transmission of the sound through the air and the denser medium,—wood. We reasoned out many of the phenomena of nature that came to our notice.

Poor Clark!—he was marked by tuberculosis, and succumbed to that disease a few years later, suffering terribly, and dying from tubercular meningitis. We began our service on a farmhouse, doing almost everything, from digging a trench for the footing of the stone foundation, to carrying brick and mortar in a hod up a ladder, to top out the chimney. In those days the frame of a building had to be mortised, the so-called balloon frame of wooden buildings as now constructed was looked upon with scorn by those farmers who were the descendants of the first settlers. The framework was of oak; the siding was poplar; the inner coating was lath and plaster as today, only then we mixed the hair with the mortar, where now the mixture is a factory product. The floors were of oak, and the finish of poplar, pine, or other soft

wood. The architecture was of a common type; either an L or a T, with a veranda in front and a porch at the back. The building was two stories high, with halls intersecting the middle. One side was the sitting-room, which connected with the kitchen, and on the other side of the hall was the parlor, to be used on Sundays and special occasions.

We began our real carpenter work on the frame. The square timbers were laid out and the boring-machine set to work to bore out the mortises, which were finished with a corner chisel, making a square hole of a round one. Sitting astride the machine frame and plying a two-inch auger with a double crank for days at a time, was quite a test for untrained arms. This was outside work. Weather did not affect this part of the work, but when we began on the material for doors and windows, we went into the barn where the finishing lumber was stored, work-benches set up, and tools provided. We ripped out by hand the material for the doors, windows, and frames, then dressed, plowed, grooved, and mortised them together. A foot-power mortising-machine had just come into use, and our bosses bought one. It simplified to a remarkable degree the hitherto very laborious procedure of boring a row of holes, then chiseling out the mortise. The lumber was yellow poplar from the Cheat River country, or white pine from Michigan.

We spent at least two weeks at this tedious yet interesting work. To ply a hand rip-saw for a week at a time is real work. The tools of the carpenter-chest at that time formed a curious collection of planes, plows, groove-planes, and moulding-planes, augers, chisels, etc. The generation before us had made even their mouldings by hand. Sash and doors and frames were still a hand-

product in the back country in our day. We boys did everything; even puttying in the glass and priming the sash.

The building of a house under such conditions occupied most of the summer, but our bosses managed to employ help enough to keep two or three jobs going at the same time. In this way we traveled about the country and changed our boarding-house often.

Interesting associations were formed. In one instance, we built a barn, and then lived in it while we were building the house. We men and boys slept in the haymow, which had been fitted up as a bedroom with several beds. We played pranks on one another. The crowning event, which provoked much hilarity, was cutting the slats in the bed of the teamster, letting him through to the floor as soon as he got in. He had been out calling on his girl till a late hour, and came in stealthily. We pretended to be asleep. He undressed quietly and got into bed. Suddenly, there was a crackling sound and a falsetto voice called out of the darkness, "Here I go!" followed by a thud on the floor. Our victim slept in that position until morning. He was an interesting character, and could sleep soundly on horseback. His horse could always find the way home.

We did some repairing of old houses, and one, a stone structure a hundred years old, had to have a new roof. In removing the old roof, one workman killed eighty bats, and then did not get them all. Evidence was there that many generations of these flying animals had made their home in this garret.

I worked at times for my old boss in the country; and as we lived with the families while building or repairing, there were many interesting and instructive experiences

with the old settlers. I worked one summer in Waynesburg; and as the hours there were shorter than in the country, I had more leisure time to devote to my books.

For some reason the carpenter trade did not hold me. I was diverted to another occupation. My brother-in-law was a driller of water-wells, and this means of doing away with disease-breeding dug-wells so interested me that I became a driller for a year or two while I was preparing for medical college.

It was during this period that I enlisted in the National Guard of Pennsylvania and attended two encampments: the first a regimental camp at Washington, Pa., and the next year a brigade encampment at Mt. Gretna. It was the first camp at this point, which has since become a famous camping place. An incident of this encampment that thrilled me was to see General Phil Sheridan ride by on review. Returning from camp, I rode on top of our railroad coach around the famous horseshoe bend of the Pennsylvania Railroad, getting a view that was most inspiring.

Arriving at Washington, we found no train to take us to Waynesburg, it being Sunday. My chum and I started out to walk the twenty-three miles home; but when we had gotten a third of the way, we met a relief train, waited for its return and came on home with the rest of Co. K. Being tired, I fell asleep by the open window of the coach, and when I woke up found myself without a cap. The Quartermaster Sergeant was able to find an extra one, so I did not have to march to quarters bareheaded. The next day my cap was brought in by a section man, who had found it along the track. It had fallen out of the window while I slept.

We wore the uniform of the Civil War,—blue trou-

sers, with coat of a darker hue, and a little flat cap with a wide, stiff visor, which would not stay on one's head without a strap under the chin, and which afforded very little protection to the back and sides of the head. It is well that it has long since been discarded and the uniform replaced by the modern hat and khaki of the present-day soldier.

I had fully decided on a medical career, and was preparing myself for it. I registered with Dr. W. T. Rinehart, as preceptor, and settled down to hard study of anatomy and physiology during all my spare time.

Faculty of Starling, 1889

Facing page 73

VII

Medical Education

During the summer of 1886 I was preparing to go to a medical college, but where to go was the problem. My preceptor was a graduate of Jefferson Medical College of Philadelphia, which was then one of the leading schools of medicine in the country. Western Pennsylvania Medical College, at Pittsburgh, was a young school that was coming to the front. As it was near home, I seriously considered going there, and one day I walked what seemed miles along Liberty Street to find the office of the registrar, where I talked with him about the school.

I do not remember what was said; but I came away with the impression that, while I might select that school, no great effort was made to secure my enrollment. In the meantime I talked with some friends, who advised Starling, at Columbus, Ohio. At Western Pennsylvania the tuition was one hundred dollars. At Starling it was fifty dollars, and that decided the question. Finance was, with me, a thing to be considered.

I accordingly entered Starling, which occupied a building jointly with the St. Francis Hospital, which still exists in the same place; but the Medical School years ago merged with the Ohio State University.

The old building, built of graystone and brick, with castellated towers, resembling a miniature medieval castle, in the early days of Columbus, must have been an

outstanding piece of architecture and a model of its kind. Its dingy rooms, meager laboratories, musty lecture and clinical amphitheaters,—one for medicine and one for surgery, with wooden seats extending around three-fourths of a circle, and the remaining portion occupied by the instructor, assistants, and clinical cases, when there were any,—form the background, in the beginning, of my medical education.

It was one of the good schools of its day; but, in the light of the present day, was most primitive in every way except in the personnel of its instructors, who were leaders in the profession, while some of them have left their names written high among the men of their generation.

Dr. Halderman was professor of surgery during my first year, but he died before the beginning of the second, and his place was taken by the registrar, Dr. Thomas C. Hoover. Dr. Starling Loving was professor of medicine and dean, an interesting instructor and a genial gentleman. One of his witticisms in his lectures was to call the hysterical woman Mrs. Peteroleum, and he referred to her often.

Dr. D. Tod Gilliam was professor of obstetrics and diseases of women and later became well known through his book on gynecology. Dr. E. B. Fullerton was professor of materia medica and therapeutics. Dr. C. Curtis Howard held the chair of chemistry and toxicology. Dr. A. M. Bleile was professor of physiology and pathology. Dr. Otto Frankenberg was professor of anatomy; Dr. C. F. Clark of eye, ear, nose and throat; Dr. C. O. Probst, then secretary of the State Board of Health, was professor of hygiene. Dr. Nelson Obetz was demonstrator of anatomy. Other worthy instructors were Drs. C. R. Vandenberg, G. M. White, and L. M. Early. The fac-

Graduating Class at Starling, 1889

Facing page 75

ulty was composed of fourteen men,—all well-informed and good teachers. Owing to distance, I have not kept in contact with either the school or its faculty, and with only a limited number of my classmates.

Meager as was this early instruction, I feel that a good foundation was laid in medical science at this old school, as good training as was to be had in most of the medical schools of that day. The completion of a course in any school is but laying the foundation for an educational superstructure, which must be built by future study and experience, and which never reaches completion.

It is interesting to observe, as I look at the photographs of the faculty, that, of the fourteen members, ten wore full beards and none were smooth-shaven. In my class-picture of thirty, there are five smooth-shaven faces and seven in full beard. The others wore mustaches.

Whiskers in that day were a mark of distinction, as they were during the Civil War period, and were supposed to add dignity to the wearer. These, with the Prince Albert coat and silk hat of the doctor, have long since ceased to be fashionable, and, along with the horse and buggy, are relics of the past.

Forty years ago homeopathy and eclecticism were at the height of their glory, and the bitterest competition was waged by devotees of the different schools. It is amusing today to think how doctors of one school would refuse to counsel with a doctor of another. They did not realize then, as we do now, that the doctor's personality rather than his remedies made for success in medical practice. The regular profession was beginning to search for simpler and more palatable remedies, and the nauseous fluid extracts and tinctures slowly gave

way to medicines more pleasing to the taste and less objectionable, or were disguised in coated pills, tablets, and capsules.

Our period has been called one of "therapeutic nihilism," and it is true that materia medica receives far less attention now than it did forty years ago.

The doctor's medicine case becomes smaller with his years of practice, and the number of his remedies becomes less as he depends on certain drugs to produce certain definite effects, and the old "shotgun prescription" has given way to specific medication. I have in my possession two prescriptions given for a single case by a "doctor of the old school," which contain twenty separate remedies, and both prescriptions were to be given at the same time. As a homely illustration, we have substituted the rifle for the shotgun in our attack on disease.

As one looks back on the past history of medicine and reads of the nauseous and repulsive concoctions that were given to unfortunate patients, we do not wonder that people revolted against such practice and accepted the little pills and dilutions of the homeopath, or the specifics of the eclectic, given in palatable form.

There were two medical colleges in Columbus in those days: the Columbus Medical, and Starling. Naturally, there was sharp competition. Both were finally merged into the Ohio State University. For one reason or another, groups of doctors in communities of any size would organize a medical college; and, as a result, there were many schools that, in the march of progress, either discontinued or were merged.

For years, through the efforts of the American Medical Association and the American College of Surgeons, the medical schools have been reduced greatly in number,

and have increased immeasurably in efficiency. It could not be otherwise if medical science was to keep pace with the march of progress throughout the scientific world. One can hardly realize that forty years should have worked such wonders in medical science; asepsis, and antisepsis,—the keystones of safe surgery,—were being discussed, but not universally accepted. The germ theory of disease and the rôle of bacteria in infections were yet in the dawn. Sanitary science was immature. Immunization was little thought of except in connection with vaccination for smallpox. What wonderful strides have been made in the prevention and cure of disease by these means!

In the interval between my first and second years of medical study, much work was done on the wooden insides of our old college building to get it ready for antiseptic surgery. Dust, soot, and cobwebs abounded in profusion on the high walls and ceilings above the amphitheater. They were to be rendered inert by the carbolic spray. Instruments were to be soaked in trays of carbolic acid solution, one to twenty. Everything else to come in contact with the hands or wound was subjected to the action of bichloride of mercury solution, one to one thousand. Rubber gloves were not then in use. The surgeon operated with bare hands. Aprons were the forerunner of gowns. Caps and masks were not known. The abdomen in those days was invaded with fear and trembling. Healing by first intention was taught to be ideal,—but too often was not realized.

Antisepsis was coming into vogue, and the preparations that were made to get the soot, dust, and cobwebs out of the surgical amphitheater, to make way for the carbolic spray, are amusing as I think of them.

The rôle of the bacteria was just beginning to be realized, and many were still skeptical about them. The house-fly and the mosquito were not recognized as the agents transporting contagion, which they later proved to be, and the old dug-well, with its surface drainage, was still almost universal, while typhoid went merrily on. Diphtheria took its heavy toll of the young. Now how differently do we look at these diseases.

There was much to learn about disease: its causes, prevention, and cure. Serum therapy was not then thought of, and intravenous medication was not mentioned. Blood pressure was estimated by the physician's touch. Three things must invariably indicate the acuity of the physician's observation,—to look at the tongue, to feel the pulse, and to take the temperature.

Our teachers did not tell us of the Wassermann reaction, nor of the Widal test, as these were unknown. We were learning something of the tubercle bacillus, and within a year or two were to be able to stain and recognize it in sputum.

We were still hearing of typhlitis and perityphlitis, which later became known as appendicitis; and we were years in coming to a workable understanding of this disease and in reducing its mortality almost to zero. We had learned that the typhoid germ had its active habitat in the intestine, and that it was cast off in myriads in the waste discharges, and that the disinfection of these discharges was a paramount duty before they were permitted to mingle with soil or drainage. Observation of symptoms were thoroughly taught; but histories and records were not insisted upon as today. Analysis of case records and of cases was not possible then as now,

for the most primitive method of making records of cases in hospitals was then in vogue.

At the time I attended medical college I had no idea of becoming a surgeon. In fact, during operations I was witnessing, I frequently felt a weakness, which caused me to seek the open air. Many people experience this sensation in the operating room, and they attribute it to the ether, as they say; but we know that the ether has very little to do with it except, possibly, in a suggestive way. To the uninitiated, the atmosphere and environment of the operating-room is a vaso-motor depressant, and is frequently attended by fainting, which is due to a temporary weakness of the heart, causing insufficient blood to be supplied to the brain. As I look back now, I can see that my manual training, which I had received in my various occupations, fitted me for the mechanical part of surgical practice, as I found later in the school of experience. I can appreciate it the more when I watch some would-be surgeons handle instruments and tie ligatures.

Having passed through the usual dread ordeal of examination, we were graduated on March 8, 1889, in due form in caps and gowns, and were grouped on the stage of one of the theaters in the city. We had finished two courses of lectures and instruction, extending over a period of two years, having studied under a preceptor for one year previously.

At that time one was admitted to the medical course on a common-school diploma and a teacher's certificate. Some of my fellow-students had had college work, but few had degrees. Thus equipped with our diplomas, we set about finding our respective locations, and mine happened to be northern Wisconsin.

Dr. Rinehart having come to Wisconsin in the meantime, I came, after graduation, to assist him. My first stop in Wisconsin was at Wausau, where I stayed for a month, assisting the transfer of the ownership of a hospital; then came to Ashland, where I assisted Dr. Rinehart in his hospital until the fall, when I went to Rhinelander and started a hospital there.

In those days there was a way of taking care of the sick and injured from the lumber camps, on a kind of insurance plan. Tickets were sold to the men in camps, for from five to ten dollars a year, which entitled them to medical and surgical service and care in a hospital,—limiting service to six months' continuous stay in the hospital. There were several competing hospital organizations operating in the northern woods, which were represented by their respective ticket agents. My preceptor was connected with the American Hospital Aid Association, and its headquarters were located at Eau Claire, which branch was under the direction of Dr. D. W. Ashum. Dr. Rinehart, after locating in Fifield, came to Ashland and established a branch hospital. The organization disbanded, Eau Claire being taken over by Dr. Ashum; the Wausau branch by Drs. A. W. and E. L. Trevitt; and Dr. Rinehart took the Ashland branch, which became the Rinehart Hospital. He continued the ticket business for several years, until he finally sold out to the Sisters of St. Joseph's Hospital.

My hospital in Rhinelander was a small affair of twelve beds, located in a building that was just being finished for a boarding house. I was then a boy of twenty-three, in some respects matured beyond my years, but badly in need of experience in the ways of the new country into which I was being transplanted. After con-

tinuing the hospital for a year and a half, I disposed of my interests to a group of local doctors, and came to Ashland to reside permanently.

My arrival in Wisconsin was like coming into a new world. The manners and customs of the people were so different, and living conditions so at variance with those to which I was accustomed, that the adjustment to existing conditions came slowly. It worked on my emotional nature, and I was probably as homesick for that first month as any boy ever was.

It was while I was settled in my little hospital at Rhinelander that I returned to Pennsylvania for her whom I had chosen as my life partner,—Miss Zura Stoops. We had long known each other, had been schoolmates. Her parents, too, had died when she was a child, and she had been adopted into a well-to-do family of farmers. She was a leader in school and a favorite with all who knew her.

We were married December 24, 1889, and in a few days came on to our new home in the north. Our first child, Florence, was born after we had moved to Ashland, May 15, 1891. Edith, Helen, and John followed in periods of two years. All have grown to maturity. All have been graduated from the University of Wisconsin. Florence is a librarian, Edith and Helen are married, and John is now an M. D. graduate of the University of Pennsylvania, and is located in Los Angeles, California.

Our family history has been about the same as the average: carrying on our work; watching, guiding, and protecting the children through infancy, childhood, and youth to maturity; educating and preparing them for lives of usefulness. No great sorrow has come to us,

and grandchildren play about our fireside,—happy, and free from worldly cares.

The hospitals of that early day in the north were very crude, merely boarding-houses, with hospital cots or beds, and from a sanitary standpoint were little better than the lumber camps. Nurses were unknown, and canvalescent lumberjacks took care of their less fortunate brethren. Improvement rapidly took place, and in 1891 Dr. Rinehart built a 75-bed hospital and made an up-to-date institution of it. A graduate nurse was employed and a training school established.

The doctor was a progressive surgeon and kept in contact with the leaders of the profession in Milwaukee and Chicago. He was a great admirer of Nicholas Senn, then at the height of his popularity, and was a close friend of Dr. C. W. Oviatt, of Oshkosh, who was one of the leading surgeons of Wisconsin and from whom he acquired much of his inspiration. I well remember our first laparotomy,—an old lady with obstruction of the bowels. The operation was done in the home. It was successful, and the patient lived many years afterward. Abdominal surgery was rarely attempted by the surgeons of the north country in the early 'nineties, but they rapidly became bolder, and as hospital service improved, they did more of it.

The surgery of the 'eighties and 'nineties was mostly emergency work; and the hazardous work of woods and saw-mill gave the doctors a large experience in the line of fractures, sprains and wounds.

Stomach surgery was in the developmental stage. The gall bladder was seldom invaded. Gallstones were treated with remedies. The appendix was becoming the subject of much study and experimental operating. Brain sur-

gery was confined to raising the fragments of a depressed fracture of the skull, and to occasional trepanning. Amputations were common, because of the operators' lack of advanced knowledge of asepsis and antisepsis in the treatment of fractures and so forth. Books on bacteriology were making their appearance; and one which I obtained early and studied much was by Dr. George M. Sternberg, surgeon-general of the army.

Medical literature was teeming with technique. Pelvic surgery was coming into vogue, and the injuries due to childbirth were being cured by plastic surgery. Neoplasms of the uterus and ovaries were subjected to operation when found. Ectopic pregnancy, with its ruptures, were treated on the expectant plan; and many a hematoma, or resultant abscess, I have seen evacuated by the vaginal route before we learned to go in and take up the ruptured tube, stop the hemorrhage, and remove the clots. Later we learned that we could remove the fluid blood from the peritoneal sac, strain it of clots, and transfuse it into the patient's own veins, thus obviating in considerable degree the consequences of hemorrhage. Science was moving rapidly, and we were eagerly pursuing it.

In 1892 we organized the Ashland Medical Society, of which I was made the secretary. It functioned with variable activity until the reorganization of the American Medical Association and the State Medical Societies, in 1903, at which time I was appointed Councilor for the Eleventh District of Wisconsin. I have remained in that office to the present time.

Immediately after the reorganization plan was adopted, the work of reorganizing the county societies began, and was carried through promptly. This required

a personal visitation of the councilor to each of the counties, to enroll the members and to explain the objects and aims of the new plan.

The membership of the state society had grown steadily. Its business affairs have been put in the hands of a full-time lay secretary, who is eminently qualified for the position, and in every way the society is doing good work and occupying a high place in the community of State societies, the A. M. A.

My association with the society as councilor has afforded me opportunity to give useful service to medical organization; but, better still, has given me contacts with the medical men of the State that have been both pleasant and inspiring. One cannot leave this subject without mentioning Dr. Charles S. Sheldon, for many years the secretary and the life of the society; Dr. S. S. Hall, treasurer for almost as long, and Dr. Rock Sleyster, successor of Dr. Sheldon as secretary, and now treasurer. He is also trustee of the American Medical Association. Mr. George Crownhart is the present secretary and has made himself indispensable to the society. There is a long list of men who have been officers of the society during its twenty-five years since the reorganization, whom I should like to honor by mentioning them, but space will not permit.

VIII

Early Practice

I had become fascinated by the emergency surgery, which came to us in considerable volume. My partner concentrated his work in the hospital, and I finally established an office outside, and kept up my general practice.

In 1893 Ashland was visited by a severe epidemic of typhoid fever, and in March, 1894, both my wife and I took the disease at the same time. After hovering between life and death for several weeks, we finally recovered. Some three months after my recovery I was able to resume my practice. Our restoration to health was due to the faithful ministrations of a trained nurse, Miss Ellen Peterson, who had come from Trinity Hospital, Milwaukee, in response to my request for a nurse who could assist me in establishing the hospital. She arrived about the time we were prostrated, and our hospital was for some time my home, with my wife and myself for patients. Too much cannot be said in praise of this faithful woman, who worked over us day and night for two months. We owe our lives to her. Few if any could be found today who could or would give the time, service, and devotion to two patients that she gave to us.

Trained nurses were scarce in those days. Training-schools were being established in the larger hospitals, in the cities. Nurses were graduated after two years train-

ing. The more elaborate three-year course came later, but did not produce better nurses.

After resuming practice, I kept Miss Peterson as a nurse, and took some patients into my home until a suitable building could be found for the hospital. There I treated typhoid fever, with the help of my nurses, with a zero mortality in the first hundred cases. Confinement to bed, milk diet, intestinal antisepsis, careful nursing, keeping the temperature under control by bathing, gave results that have not been improved upon in the treatment of this disease, which has almost been eradicated by vaccination and a more rigid sanitation. I have often said that if I had to choose between a nurse and a doctor in typhoid fever, and could not have both, I would choose the nurse. Other work came to the hospital, and surgery became predominant after the epidemics of typhoid, which recurred each fall, were wiped out.

It was interesting to work out the cause and behavior of these epidemics of typhoid. They began in the lumber camps in the after part of the summer, when the house-fly had access to the kitchen, the dump-piles, and the outhouses. Patients were brought from the camps to the hospitals. Without proper disinfection, the discharges of these patients were thrown into the sewer and carried out into the bay, which was the source of the city's water supply. Within two or three weeks from the time patients commenced to arrive at the hospitals, typhoid began to make its appearance throughout the city. True, the intake pipe extended a mile out into the bay, where the water was supposed to be taken in; but the pipe was laid on the bottom of the bay and the dragging anchors of ships would occasionally break it apart, and then polluted water from near shore was admitted. This was

known to have happened. The pipe was finally buried six feet deep, in a trench dredged in the bottom of the lake, which secured it from injury. A filtration plant, with chlorinization of the water, was added, and then the epidemics of typhoid disappeared. I early recognized the cause of typhoid, as before set forth, and in my hospital carried out a careful disinfection of all infectious discharges. I repeatedly called attention to the house-fly as the most active agent in the dissemination of typhoid. It is a matter of common knowledge now, and this pest is much less a factor, since we not only use means to destroy it but prevent its multiplying by eradicating its breeding-places and screening it from our houses. The presence of a fly on the dining-table or in the kitchen of the modern home is the signal for hostilities until the fly has been killed. How thoroughly we learned this lesson during the Spanish-American war—at Montauk, Chickamaugua, and other camps,—and how that war contrasted with the recent World War, when the incidence of typhoid was negligible. I probably never learned anything better than I did the treatment of typhoid. I certainly never attained greater success in the treatment of any other pathologic condition.

My hospital became known, and was well patronized, largely because of the nursing. In 1895 I obtained articles of incorporation for the Ashland Training School for Nurses, and began with six students. These were increased to ten; and for ten years the hospital and school flourished. The period of training was two years. One memorable event during its history was the occurrence of a case of smallpox. It was the first case that had occurred in the city for so long that no one could remember a previous one. The town was horrified, and

people crossed the street to avoid going past the hospital, though it was set some twenty feet back from the sidewalk.

Fortunately, my resident doctor agreed to stay and take care of the patient. The nurses and the patients who could not get away,—to the number of fifteen,—were quarantined, and I was obliged to bear the expense of the upkeep of the outfit during the period of quarantine,—some three weeks. The patient recovered, but instead of being compensated, the case cost me about twelve hundred dollars.

I had, some time later, another interesting experience with smallpox. I was called to a neighboring town, forty miles away, and found two members of a family had that disease. A prominent man from a distant city was staying at the house, and frequently stayed there during his hunting and fishing trips. He had suspected the trouble and was making preparations to get away, which, of course, the quarantine regulations would not permit him to do. He was panic-stricken, and determined to get away. It was finally arranged that he should walk several miles to the next station, then take the train I was returning on, and I would take care of him.

I brought him to the hospital, had him take a complete bath, disinfect all his clothes and effects, vaccinated him and gave him a room for the night,—then sent him on his way next day, a happy man. He did not take the disease, nor did he give it to anyone. Smallpox has in recent years been robbed of its terrors by vaccination and by the humane treatment of what was once regarded, and still sometimes is, as being a loathsome disease. Like all communicable diseases, we have learned more about how

to treat them, and how to make quarantine effective, without neglecting or penalizing the unfortunate patient.

During the early days of my experience there was no ambulance in the city, and patients were brought in on cots in the baggage-cars of the trains, then were taken to the hospital on drays, the draymen vying with one another for the patronage, as they do for baggage.

I had an ambulance built, and patients were given more comfortable transportation,—more in accord with the growing appreciation of the mission of the hospital. My ambulance was a one-horse, covered rig, with good springs, comfortable to ride in. It was not long before one of my competitors had a better one built, to be drawn by two horses. Thus competition makes for better service, and the many get the benefit of the sacrifice of the few.

I started the first training-school, got the first ambulance, and instituted many things that later became public property. I did the first hysterectomy, the first mastoid operation, the first prostatectomy, the first spinal puncture, the first rib resection, the first transfusion of blood, and the first Cæsarean section that were done in the city, and I can point to these operations with satisfaction; for all the patients recovered.

My little hospital had a laboratory that was "up" to its time, and an operating-room in which aseptic operations were done, though my first operating table was of wood, made by myself.

Wearied of the details of running a hospital, in 1905 I made arrangements with the St. Joseph's Hospital, which had just then completed a new building, to take what property I had that they could use, and make me their chief surgeon. This was fully agreed to by the sisters,

but was resented by the doctors connected with the hospital, though none of them was qualified to do major surgery.

I fitted up my own operating-room, of which I had exclusive use for some two or three years, until a new wing was added to the hospital, and then by mutual agreement one large well-equipped room was provided for all, which proved to be adequate to take care of the surgery of the hospital. My own little hospital of thirty beds became a thing of the past. I closed it, disposed of the furniture, and finally tore down the building, for it was useless for anything else. It was built of good white-pine lumber, which could be used for other building purposes.

I went into St. Joseph's and, in quoted language, "burned my bridges behind me." I met an antagonistic spirit there, which never became reconciled, though my efforts in that direction were active and persistent.

I instituted an adequate and up-to-date operating-room technique; persuaded the sisters to wear a white sterile covering over the dresses they wore among the patients; to have an operating-room force that was not working at the same time on the floors; and instructed them in the principles of sterilization, asepsis, and antisepsis. From a most crude condition was evolved an acceptable technique, though it seemed to me that progress was unnecessarily slow.

I urged the sisters to establish a training-school for nurses; but this they were slow to do. Sisters of more than ordinary intelligence who came to assist me in the surgery department were not permitted to remain long and were moved on; but the less progressive ones were permitted to remain. Thus progress was retarded and

my patience sorely tried. The sisters finally started the training-school; but the training of nurses outside the sisterhood was new to them, and for a long time they doubted its practicability. The school, however, proved to be a success, and it fell to my lot to preside over the first graduation and present the diplomas to the nurses of the first class.

When I took charge of the surgery of this hospital, it was just after a bitter Protestant and Catholic war had been waged for a few years, known as the A. P. A. movement. I had taken no part in the controversy; but, as usual, on the principle that "if not for us you are against us," I found the prevailing spirit antagonistic. At that time few Protestants would go to the Catholic hospital, and I had much difficulty in breaking down this feeling, but succeeded in a very large measure in doing so. Not being a follower of any creed, I could not see what difference church membership made in the qualifications of anyone to treat or care for the sick; and it seemed to me that religious prejudice had no place either with the doctor or the hospital, and that service should be rendered and received without regard to creed or belief.

The hospital became popular. It was growing in size and efficiency. Religious prejudice was for a time forgotten. But it became more and more apparent that the sisters' hospitals were run in accordance with Catholic ideals and that everything must bend to the inflexible rules of that church. I had seen demonstrated, in matters where the religious question was involved, that creeds would not mingle any more than would oil and water.

I never joined a church, though I attend them all on occasion, and respect any and all forms of sincere religious belief. I am amused at the claims of the many

creeds that insist that they alone possess the key to Heaven. Religious devotion is the foundation of civilization; but religious fanaticism is dangerous to human progress, and its crimes against humanity have made many black pages in history.

Belief in a Supreme Power, and a spirit of tolerance in forms of worship of that Power, should actuate the whole human family and guide its destinies. The grouping of people for spiritual or for temporal power seems to me inconsistent with universal progress; and to use the hospital as a recruiting station for some particular church or creed is not in keeping with modern medical science, though to all the sick should be accorded the solace and comfort their spiritual adviser of their own choice can give them. Spiritual consolation is one of the greatest of aids in the treatment of the sick, and a feeling of mental and spiritual well-being is as important as the relief of pain or the quenching of a fever; but everyone will not accept such consolation from the same source.

In 1916 a movement was started to establish a general hospital, to be conducted as a non-sectarian institution. I was asked to head the organization. There was a widespread demand for such an institution; and when the Ashland General Hospital Association was incorporated and campaigns were put on to finance it, there was ready response. Forty thousand dollars was raised on the first campaign and a year later $20,000 was raised in the same way. Later a bond issue of $30,000 was floated and was readily sold.

The hospital grew rapidly into one of the substantial institutions of the city, and the rivalry of these two hospitals in courting public patronage resulted in a high class of service, given in both.

Ashland General Hospital

Facing page 92

The ideals which have been woven into the fabric of the Ashland General Hospital will be found recorded in another chapter.

IX

Some Interesting Experiences

Many interesting experiences come to every doctor, some of them tragic. My own experience has been enriched by occasions on which I have been able to save life.

The tragic ones have almost without exception been due to delay in applying proper means of relief until it was too late. Some have been due to lack of proper diagnosis and to hesitation on the part of some doctor to call consultation in time, or to get the patient into special hands in time for remedial measures to be of avail. Peritonitis from appendicitis, or the rupture of some viscus in the abdomen, is so deceptive in its course that many patients have lost their lives by the delay. Unfortunately, I have had many such cases. The forlorn hope of operating on a case of peritonitis in the terminal stage is one in which the surgeon indulges, feeling that without operation the patient will surely die, while there is a chance, though a remote one, that recovery may follow operation. To abandon such a patient to his fate has always seemed cowardly to me, and I have always given him the benefit of the only chance there was, though my mortality statistics have been unfavorably influenced thereby.

A year ago a man was brought to me from one of the islands of the Apostle group. He had been struck in the abdomen by a log, and while apparently not seriously hurt, he sickened soon after and was brought across the

ice and hurried to the hospital. I recognized a surgical abdomen and operated at once. A perforation of the bowel was found and closed, with recovery of the old man from a condition that would most certainly have proved fatal had he not been promptly operated on.

Another man, later brought from the same place, with a broken back, was brought over in a boat, which was pushed part way over the ice and rowed over patches of open water. The difficulties of transportation necessitated much rough handling of the man, and as a result the spinal cord was hopelessly injured; and though an operation was performed to relieve pressure of fragments of bone on the cord, the paralysis was not relieved. He died a few days later. Such a case would have been better if left perfectly quiet in the camp; but, of course, the layman could not be expected to know this, and it was natural to want to get the sufferer to the hospital as soon as possible.

Now and then a man is shot while hunting in the woods, generally some distance from relief. When wounded in the abdomen, there is usually perforation of the digestive tube, with consequent escape of contents,—which will cause peritonitis. Prompt repair of the injuries will often avert a fatal issue, but the shaking up incident to removal to the hospital robs him of his only chance. I often think it would be better to leave such a patient quiet where the accident occurs and bring relief to him rather than to allow him to try to walk or to be shaken up by being carried out. Here, again, it is natural for his companions to try to get him to the hospital as soon as possible. He always arrives at the hospital in the worst possible condition from the churning up of the abdominal contents. The same is true of the attendant

internal hemorrhage that follows gunshot wounds. Being in a region where much deer-hunting has been done, many gunshot accidents have occurred. It is remarkable that such accidents are much more common in the north woods, where the short, high-power rifle is in use, than in the hills, where everyone was a marksman and used the old-fashioned long, muzzle-loading rifle.

In the days when the set-gun was used along the runways where the deer traveled, many serious accidents occurred, for a man would set one of them off as well as a deer. Legislation outlawed this murderous custom, but not soon enough. The man who would set a gun deserves to be the victim of it himself. Every hunting season brings to the surgeon one or more gunshot wounds. A few years ago I would have several every year. Fortunately, they have become less in recent years. One rather remarkable case was a man who had received a charge of shot at close range in the right groin. A deep ragged wound was found, and in clearing out the debris I came upon some metal, which proved to be the fragments of his watch, which had been shattered and driven deeply into his body.

Many serious gunshot wounds have been caused by the hunter drawing his gun after him while crawling through a fence, over a log, or by standing on a stump and letting the butt slip off and fall, striking the hammer; all due to carelessness, of course, but a fruitful source of work for the emergency surgeon.

On one occasion I was asked to go with the chief of police for a new-born babe that had been found by some children in a clump of bushes, where it had been born and abandoned by its mother. We met some men carrying the little creature, covered with grass and dirt. I

quickly took off my coat and wrapped it about the baby and rushed it to my clinic, where the nurse in charge gave it a warm bath and wrapped it in cotton. It was then taken to the hospital, where it was cared for. It revived and became a healthy child and was for many weeks the pet of the hospital. It was finally adopted by a childless couple, and is now growing into attractive girlhood.

For many years the unusual happenings of almost daily occurrence kept me on tiptoe to be prepared to deal with every emergency that arose; and it is not in a boasting spirit that I say I do not remember an instance when I was not equal to the occasion. There are always certain definite things to do, and a cool head will generally suggest the proper one.

I was called to a man who had attempted to commit suicide and had, in common parlance, cut his throat from ear to ear. He was quickly loaded into a rig and was on his way to the hospital when I met the dray. I mounted the dray and, finding the man bleeding profusely, quickly clamped artery forceps on the bleeding vessels, on the way, and when he reached the hospital tied the vessels and sewed up the cuts. He later recovered.

On one occasion I was able to save the life of a child by the prompt intervention of surgery. It had a plum-stone lodged in the larynx, and was moribund from suffocation when brought to me. Though preparations were quickly made for operation, the child had ceased to breathe. I quickly opened the trachea, and by artificial respiration and oxygen, the little patient began to breathe; then with a forceps passed through the opening, the stone was grasped and removed. The child made a good recovery.

The relief afforded by tracheotomy in cases of obstruc-

tion in the larynx due to foreign bodies, growths, swelling, or exudate has many times made me glad I was a surgeon.

I have operated many times under the most unfavorable conditions, with surprisingly good results. Some of the instances stand out vividly in memory and many are forgotten, as almost every day has brought something out of the ordinary. On one occasion I was called into the country and found a woman white and almost pulseless from an internal hemorrhage due to a ruptured tubal pregnancy. Operation must be done at once, so an improvised operating-table was prepared in the dining-room. I had anticipated the trouble and had taken a nurse with me who could give an anaesthetic. It was dark by the time we were ready and we had to operate by the light of a kerosene lamp, which went out before the operation was finished. I, however, found the tube; ligated it, stopping the hemorrhage, and finished the operation mostly by sense of touch. The patient made an uninterrupted recovery.

I have had my share of experience with delirious patients, but the one I am about to relate heads the list.

When I was running my own private hospital, I had a young man come in with what proved to be typhoid fever. He became rapidly and violently ill, but showed no signs of being beyond control. One morning about four-thirty I heard a commotion in the hall. I was sleeping directly under his room. Going quickly into the hall, I found the nurse trying to take a lighted lamp from the patient. Seeing me, he suddenly threw the lamp; which fortunately went out, though it broke into fragments. He then dived through the glass panel of the front door, ran over to the railroad yards, into a coach, which the cleaners were

getting ready for the early morning train, grabbed a broom and struck out every lamp in the car; then, grabbeing a coupling-pin, fought off his pursuers and ran down town to a dry goods store, broke in the glass panel of the front door, went in, and found a woman's skirt which he put on. He then went over to a hotel, where he asked for a room. The storm seemed to have spent itself, and he had quieted down when I found him. I had expected he would be terribly cut up by going through two glass doors, but, strangely enough, he had only a few cuts and scratches. He apparently had a hallucination of being pursued and was making these heroic efforts to escape. He recovered, and is now a prominent physician in St. Paul. In a recent conversation with him he stated that the only reason I am living today is that a friend who had accompanied him to the hospital had taken a gun from the hand-bag he had with him.

One of the most interesting cases that occurred in my emergency surgical practice was that of Jadzewsky, who was tending edger in one of the local saw-mills. He was struck in the chest by a "fly back," which in this instance was a two-inch edging, twelve feet long, two inches square at one end, and tapering to a point at the other. The pointed end had struck him in the region of the left nipple, had passed through the chest, until the point punctured the skin of the back. The edging then broke off, and again struck the chest on the opposite side and passed through and out of the back. When the force of the projectile had been spent, the edging had protruded and stuck out from the back a distance of four feet.

I was called, and, on arriving, found that his fellow-workmen had sawed off the projecting end and had whittled it down so that it could be withdrawn. I had him

transferred to the hospital at once and proceeded to extract the small end which was still in the chest. Fortunately, it was found that the second penetration had been between the muscles and ribs, so was not so serious as first thought, though the wound in the lung was serious enough, since fragments of clothing had been carried along the track of the edging, and fragments of bark were left, which could not be reached. Strange to say, he had only slight shock; and though he coughed up fragments of wood for several months, he finally recovered, and today is carrying on his business as a milkman, apparently no worse for his experience.

I was called twenty miles into the country one February day, with the temperature fourteen degrees below zero, to see a sick boy. From the history, I suspected a case of appendicitis, and found that it was. I had taken assistance with me; and in the meager equipment of a farmer's kitchen we made ready and removed a gangrenous appendix. The snow was deep, and it was in the days when we must travel with horses, following the road when we could, and taking to the fields to avoid drifts. We felt repaid for the hardship endured, as the boy promptly recovered. Now the snowmobile makes these winter trips much faster and with very much greater comfort.

The settlers have learned to build rude tops on their sleighs, some with stoves in them, so that winter travel, even with horses, is much more comfortable than formerly. Now the children are taken to school in these covered and heated sleighs.

My son, while ship-surgeon on a steamship sailing between San Francisco and New York, had an experience that contrasts so vividly with conditions when I began

A Covered Sleigh

A Snowmobile

Facing page 100

practice that it is here inserted from a newspaper clipping, giving an example of maritime courtesy and humanitarianism, combined with modern science and the radio, not yet surpassed in the annals of medicine:

Ashland, Wis.
Dec. 30, 1927.

This is the story brought by the American S. S. *Columbia,* sailing from San Francisco, Nov. 22, arriving at New York Dec. 24:

The *Columbia,* one of the fleet of the Panama Mail S. S. Co., passed through Panama Canal, set its course for Havana, from which port it was to proceed to New York. The vessel was well out in the Caribean Sea, when a radio S. O. S. from a British vessel asked for the services of a physician. A man aboard the vessel was seriously sick and needed a doctor. It was in the evening, and the seas were fairly rough. The ship's surgeon on the *Columbia* was summoned, and he proceeded to inquire into the symptoms of the sick man, after which he prescribed for him, the conversation on both sides being by radio. Then the *Columbia* proceeded on its trip. Again came the S. O. S. The sick man, who had seemed for a time to be benefitted by the medicine from the ship's chest of the Britisher, as prescribed over the radio by the doctor on the American ship, was now much worse. The *Columbia's* navigator took up the radio conversation, ascertained the Britisher's position and its course, turned the *Columbia* about in the darkness, and finally brought up near the Britisher, who kept close contact by radio. The British master lowered a small boat, and took off the American doctor, and took him to the British vessel. Just to make it interesting, the wind had come up, the seas were rough, and it was in the middle of the night, so that the trip from one ship to another in a small boat was rather precarious. The doctor found that the patient, a Hindoo, had a severe attack of gastro-enteritis, prescribed for him, remained with him as long as he could, and then was returned to the *Columbia.* Both vessels proceeded on their courses, and later the British ship radioed that the man was much better. Thus there was established a striking example of international courtesy, and a man's life may

have been saved, under unusual conditions, that could not possibly have been found until very recently.

The doctor was John M. Dodd, Jr., son of Dr. J. M. Dodd of Ashland, Wis.

We now read of the doctor visiting his patients at a distance by aeroplane, and aeroplane ambulances are already in use. Thus, we are learning to provide prompt service to our unfortunate fellow-beings, which is so essential in the treatment of many conditions, where delay is serious and often fatal.

While we glory in the achievements of our profession, we deplore seeing it commercialized by unscrupulous men for their own personal gain. As is always true when a new treatment is adopted by the profession, and often when it is not recognized by the general profession, there are some who, through various means of advertising, will use it for their own personal gain.

The radio is the latest means of reaching the public by these vampires. Just now we are being regaled (when we will listen) with a lot of slush from a privately-owned station out in Kansas. The faker specializes in the transplanting of glands, which are supposed to make men young again. It is an improvement on the old "Lost Manhood" advertisements of the newspapers, and is much more effective in catching suckers, for this charlatan's bait is one on which many neurasthenics will bite. I have seen some of his brazen literature, and wonder why such quackery can be tolerated by the people who control the radio. He will get rich off his unfortunate dupes in a short time, for there are many who will pay him his fee of $750.00 for this useless if not criminal operation.

If we must tolerate these quacks, let us hope they will get rich quick and then adopt some more honorable vocation. Verily, the quack is ever with us, to cast reproach on an honorable profession. Compare him with the man who subscribes to and tries to follow the fellowship pledge of the American College of Surgeons.

The following letter I received from a friend of mine, Dr. H. G. Mertens, of Bayfield, Wis., which depicts contingencies doctors have met in this part of the country:

DEAR DR. JOHN:

Some time ago you mentioned to me that you were writing a book of autobiography and expected to incorporate in it some of the interesting and unusual experiences of your own as well as those of your medical friends. It occurred to me that the following experience might be interesting from a standpoint of showing your readers that even in this day and age we still have experiences such as medical pioneers in this section encountered thirty or forty years ago.

On Sunday, March 18, I was called out to see an Indian woman living about six miles from Bayfield. As the roads were impassable, I hired a car and drove over the ice as near to the place as we could, then walked about a mile-and-a-half. I found the patient and thought that she was in labor. She gave a history of having had a great deal of trouble during her confinements, and I was not at all keen in accepting the responsibility of attending her so far away from any help. Nothing happened, however, until Wednesday morning following, when I was again called to come in a hurry.

After making an examination, I satisfied myself that it would be highly dangerous to confine her at her home, and suggested that she go to the hospital at Washburn, eighteen miles away. Of course, we had to drive across the ice the whole distance. She consented to the arrangement, and I had the farmer, who was a white man with a couple of bales of hay on his daredevil sleigh, put blankets and fur robes on it, and in that we transported her

to the car. After getting her settled in the car, she was quite comfortable, and we started off in a straight line for Washburn. A light snow had fallen the night before, and, as usual, the wind was blowing on the ice as soon as we got away from shore. However, nothing happened, and we sailed along 15 to 20 miles an hour until we came to a point half-way between Bayfield and Washburn, opposite the Sioux River, when, without warning, our car ran into a bad bank and stalled, and nothing we could do would move it either way. We had no shovels, and we were six or seven miles from the nearest telephone.

About this time the woman began having pains,—brought on largely by the nervous excitement of being stalled out on the ice. Pains became quite severe and regular, and I prepared to act as accoucheur in the middle of Lake Superior. I directed the chauffeur to run on a quarter-of-a-mile from where we were stalled, where I saw some poles, which marked nets of fishermen,—telling him to break off several and bring them to the car. We drove these poles into the snow-bank on the leeward side of the car, used the blankets and quilts for a wind-break, and placed the heavy fur robe on the snow; which done, I was ready to proceed whenever it should become necessary,—the only thing lacking was a bowl of hot water.

About this time we noticed a speck on the ice ahead of us, which I thought was a fisherman with a horse, and thinking that he might have shovels, directed the chauffeur to run ahead and see. However, it turned out to be a new Ford car going toward Bayfield.

We hailed the car, and it came across one-half mile of snow,—breaking a new trail, —and the driver pulled up alongside our car. By this time my patient had quieted down somewhat. I loaded her in the new car, both myself and the chauffeur going with her, and started back to Bayfield, in order to catch the noon train going to Washburn. We arrived there just in time. The patient was put in the coach, made comfortable, and I breathed a sigh of relief.

When we got down to Sioux River and got a view of the ice, saw our abandoned car about three miles out, the sight seemed to have a stimulating effect on the patient, and she immediately began to have pains. I hushed her up the best I could, told her to hang on another ten or fifteen minutes; but this seemed to make her

worse rather than better, and before long she yelled at the top of her voice, "It's coming, it's coming!" The brakeman rushed in and emptied the coach. I quickly threw off my coat, rolled up my sleeves, and put on gloves; commandered an old farmer-woman, and told her that she was hereby commissioned nurse. She happened to be Slovak and could not understand what I said; in fact, she could not even undo the woman's clothing for the purpose of aiding me in making the examination. When I finally got to the examination, I found there was no occasion for immediate worry.

Dr. Axley met me at the station, and in a few minutes I had the woman on the table, where she remained for one-and-one-half hours before the infant was born. After delivery, she had a postpartum hemorrhage, which certainly would have finished her had she been at home, because it required the combined efforts of Dr. Axley and myself to check the hemorrhage. She made an uneventful recovery, of course.

Just a few nights before this I made that same trip to the Washburn Hospital with a young Indian girl less than fifteen years old, with a deformed pelvis, for the purpose of relieving her of an infant that should have been born by Cæsarean section; but, because she had been worked on for a day, this method was too hazardous, and the craniotomy was done and the girl recovered.

I thought that, since you were writing a book of reminiscences, that these two cases illustrated better than anything else I know, some of the difficulties which physicians even now experience, and prove that in the country we are still in the pioneer period.

Fraternally yours,

H. G. Mertens, M. D.

X

The Bicycle and the Automobile

When I came north I brought with me a Springfield roadster bicycle,—one of the kind with a large wheel in front and a small one behind. On smooth roads one could sit aloft and ride comfortably, but when an obstacle was encountered, or a rut in the road, the wheel stopped,—and the rider went on. "Taking a header" was so common that it was no novelty, and while injury seldom occurred, there was always a shock to the rider's dignity, especially when there was anyone looking on. The main street of Ashland was then planked full width with three-inch white pine planks for a distance of some two miles, and on this wheeling was good. Board sidewalks ran to all parts of the city, and I made use of the bicycle as a means of transportation in my practice. For a time I was the only bicycle rider in the city; but others took it up, and then the "safety" came into general use, with its two wheels of equal size, between which the rider sat, safe from "headers." The bicycle rapidly grew in popularity, and several of the physicians substituted it for the horse and buggy, or made it an adjunct. It retained its popularity until the automobile came into common use, then it almost wholly disappeared.

I well remember the first bicycle I ever saw. It was a Columbia, made by the Pope Manufacturing Co., of Boston,—a beautiful creation, being nickel-plated throughout. The exhibition was one of the attractions

My First Automobile

Nash at the Same Place

Facing page 106

of a county fair. A lady in tights was to ride the bicycle and run a race with a horse around the race-track. She beat the horse, of course, which was doubtless prearranged. To see the female form thus displayed at a period when fashion and modesty decreed that it should be covered from view from foot to chin, makes it difficult to determine which was the greater object of interest,—the girl on the wheel, or the bicycle; but it is certain that the combination was the sensation of the day. A picture of the fairground on which this exhibition took place is shown elsewhere in this book.

I find that in Europe the bicycle is still much in use. There the roads are better, and in places bicycle paths are provided. It is likely to come back; but its use will be limited since the coming of the self-propelled vehicle, —as the automobile will always take first rank, until it is supplanted by the aeroplane.

The bicycle was destined to be superceded by the horseless carriage, soon to be known as the automobile. My first car was the fifth brought to our city, and arrived early in July, 1905. It was a two-cylinder, two-seated vehicle, with a rating of twelve horsepower. It was made by the Pope Manufacturing Co., which had taken over the Tribune bicycle factory at Hagerstown, Md., and the car was named Pope Tribune.

A picture of it may be seen on the opposite page. Cars of that day were without top or windshield. The rear seat was closed in with doors, but the front was open; therefore, the driver was compelled to wear goggles to keep the dust from his eyes, gauntlets, duster, and lap-robe. The horn was actuated by a rubber bulb, and the emergency brake was outside. The lamp burned acetylene gas generated in a carbide tank on the running board.

Small dashlights burned kerosene. The driver sat on the right side of the car, and the seats were well elevated. There was scarcely anything about the car of that day that was durable or dependable. One had to carry with him a complete repair kit and be something of a mechanic if he expected to get back home after starting out.

How interesting the development of this vehicle, and how rapidly it came! The windshield soon came as regular equipment. Acetylene gas in cylinders soon replaced the tanks, and ere long electric lights supplanted the carbide. Soon afterward tops were put on, front doors closed in the front seat, and cylinders were multiplied, to give greater power. The driver moved over to the left side of the car, and finally the closed top replaced the folding one, until now few open cars are seen. The greatest boon to the driver was the self-starter, which passed through several stages of development before approximating perfection; but now the crank is a part of the emergency equipment.

Having driven an automobile for twenty-three years, I have covered some two hundred thousand miles in that time. I have had many varied experiences, some narrow escapes, but no serious accidents. Some were amusing: as once, when a front wheel came off and rolled into the brush by the roadside; again, when my car jumped out of a rut in a frozen road and plunged down several feet into a swamp, breaking off a wheel. I happened to be in reach of my farm, and got a team to draw me home on a skid.

One instance was a near-tragedy, when, with a low-powered car, I stalled on a hill so steep that even the brakes would not hold. It was midnight, and very dark. The doctor with me got out and blocked the wheels with

a chunk of wood, while I released the clutch. The brakes would not hold, and the car started back down the hill. I turned it, thinking I was running into the bank, but, instead, ran off the other side of the road, where there was a fill made of logs several feet high running off to a steep hill below. The rear wheels dropped over, letting the frame rest on the top log. Fortunately, the car stopped and did not fall backward. We left the car and went to a farmer's, where we were given a bed until morning, when we went out with the farmer's team, let the car down the hill, and hauled it back onto the road. Some guardian angel was on the job that night, for had the car struck the offset diagonally, it would surely have turned over and rolled down the hill, with the driver inside.

A rather amusing incident occurred when my car stopped in the road and refused to start again. On investigation, I found that the gasolene tank, which hung on the rear of the car, was missing. Just as I was starting back to look for it, a repair truck of the lighting company came along with my tank. The men had picked it up some three miles back where it had dropped off. There had been enough gasolene in the vacuum tank to take the car that three miles. A long walk I would have had to find it.

I have had many experiences in getting the car out of mud-holes and snow-drifts, and have had to have the assistance of horses very often. Once, in the days of the crank-starter, I got a Colles fracture from a kickback; and once, when I struck a stump and broke the crank, I got started by the tow of another car, and, being many miles from home, was very careful when stopping, to see that I was on a hill where the car would start itself, by

throwing in the clutch and letting it coast down the hill. Running out of gas in the dead of night, miles from a source of supply, has happened to me; but generally a farmer could be found from whom enough could be obtained to carry me on to the next filling-station, though it was not always easy to find the gas man.

I always carry a heavy tow-rope, and I frequently have the pleasure of pulling some fellow-traveler out of the ditch. These are commonplace experiences. All motorists have more or less of them.

An interesting experience of a few months ago may be worth relating: On my way home from a medical meeting in a neighboring city, at about 1:00 oclock in the morning, and some thirty miles from home, I came upon a touring car at the foot of a hill, with a man standing beside it. I stopped to see if my fellow-traveler was in trouble. He greeted me with, "Can you give me pull? I got halfway up hill, and car stop. I can no start it and let it run back down hill." "All right," said I. "Have you got a rope?" "Sure," said he, and brought out a piece of clothes-line. I said that would not do, and brought out my own tow-rope. I looked into his car, and there were his wife and six children. They were on their way from Hibbing, Minn., to Ironwood, Mich., to attend a Finn celebration of some kind. There was the whole family, packed like sardines, in a five-passenger car. I hitched on, pulled the car to the top of the hill, and started them on the way, telling the man to go on as far as he could and I would follow; for I realized that there were other hills he would not be able to get up. It was a beautiful night, with a full moon, and I enjoyed loafing along a good road under a moonlight sky, which cast a pleasing glow over the hills and woods

by the way. A few miles farther on I overtook my Finn friend, stalled on another hill. He said, "Now I got a flat tire." "Haven't you got an extra tire?" I asked. "No," said he; "but I got two casings, but no inner tube." I looked on the rear of his car, and there were two old empty casings.

He was by that time pumping up his flat tire, and when he had secured a fair degree of inflation, I hitched on and drew him up the grade. A little farther on he stalled on another hill, and again his tire was flat. I urged him to work his pump vigorously, and again hitched him on. Reaching the top of the hill, I looked back; he was still at the foot of the hill,—the rope had broken. So I backed down and tied on again. This time I got him up, then urged him to go as fast as he could and get as far as possible before the air should be out of his tire again. I came up to him a few miles farther on, where he had turned into the wrong road, and told him to back up and turn the other way. He said, "I can't back, the reverse gear won't work." Thereupon two of his children, girls fourteen and fifteen years old, got out and pushed the car back; which was easy, for the car was on a grade. He was soon under way again. I had told him of a garage in the city that was open all night, and directed him to it. He stopped after crossing the avenue, where he should have turned up, and as he could not back up, I ran alongside and told him to follow me and I would guide him to the garage. He followed; and when I got to the garage I looked back, but could not see him. Soon he came walking down the street, and on coming up to me said, "Now I am out of gas." He was within a block and-a-half of the garage when his car stopped.

I told him to go back to the car, and I would go around

the block, come up behind him, and push him to the garage. This I did; and he and his family were safely landed at last. "How much I owe you?" said he. "Nothing at all," said I. "Well, you're a yentleman,—I never have anybody treat me like dat." I assured him it was a pleasure to have helped him out; and, in fact, I had enjoyed this unusual experience. He and his family would have been left by the roadside the remainder of the night had not I, or someone else, helped them in. He was certainly brave to start on a 150-mile trip with an old car that was ready for the junk-pile.

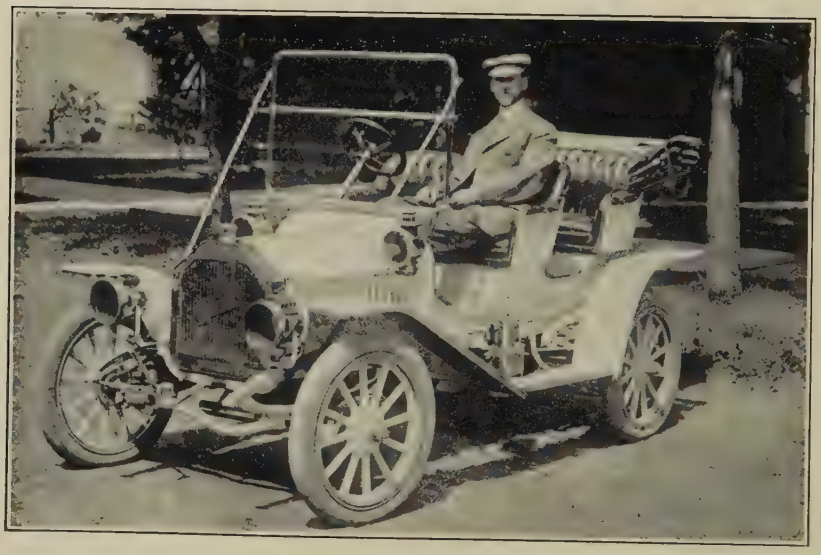
To return to automobiles in general: steels have been so standardized and parts so related as to strength and durability that one now has no use for his tool-bag, except to change a tire or wheel.

Of all the modern conveniences supplied to mankind, the automobile stands alone as costing less today than twenty years ago. My first license number, in July, 1905, was 661, which it is fair to assume was the number of cars in Wisconsin at that time. The number of licenses issued in Wisconsin in 1927, twenty-two years later, was 609,950 for autos, or 705,651 for all motor vehicles.

My second car was an improvement on the first. It was of another make, and had four cylinders. My third was of the same name and somewhat improved. The fourth was a Hudson cabriolet, a beautiful and substantial creation, which lasted five years; then followed a Nash, another Hudson, and a Nash,—seven cars to date, which, comparing the last with the first, seems like the transition from ox to race-horse. The story of the automobile would fill a large volume. It is one of the wonders of this age.

I have had experience with most all kinds of trans-

The Snowmobile—Dr. A. W. Lockart



A Buick in 1910—Dr. A. O. Shaw

Facing page 113

portation from ox-team to aeroplane. My first flight in the aeroplane was at Newport News, Va., in April, 1916. I had gone there to visit a daughter, whose husband was an aviator and an instructor at the Curtiss field. Here I had the pleasure of meeting Captain Baldwin, the famous balloonist, who was in charge of the field. My experience here is described in a letter to the Ashland *Daily Press:*

Out at the Curtiss Aviation School there is much activity. Men are being trained for civilian service and for the Army and Navy. Aeroplanes are so common that people pay no more attention to them than to the buzzards, which can be seen hovering about, most of the time. Aeroplanes are continually going up, circling about, and alighting in the landing-fields. As many as eight machines were seen at one time in the air. They look like so many dragonflies.

It is here that Walter Lees and Paul Culver are located. Walter is an instructor, and is known as the best and most careful man at the station. Paul is in the Army Aviation Corps and is awaiting assignment to duty. Both seem to be favorites with Captain Baldwin, the head of the school, and popular among their fellows, a group of the finest young men I have ever seen. At Walter's request, I went up with him after donning a leather coat, a helmet that covered head and ears, goggles, and heavy gloves. I climbed into the front seat, usually occupied by the student, and was fastened to the seat by a belt. The engine was started, and we bounded along over the ground out to the starting-field, so as to go up into the wind. With a deafening roar of the eight-cylinder, 100-horsepower engine, with open exhaust, just ahead of me, and the air rushing past one's head with the force of a gale, driven by the propeller revolving 1400 times a minute, we sailed upward. I watched the earth gradually recede as we circled up to a height of 3,500 feet, then pass by like a panorama.

The landscape presented a bewildering variety of scenes,—from the harbor, dotted with craft, to the city laid out below like a checker-board, the surrounding country melting into the haze of

the far-off horizon. Though going at the rate of 75 miles an hour, we seemed motionless, the landscape moving instead. As one tries to analyze his sensations while in the air for the first time, he is confused by their clarity and quick succession.

Conversation between driver and passenger is impossible, except when high in the air, when the engine is shut off, and we float along, seeming to stand still. When Walter's voice came, as from a distance, "How do you like it?" my only response was, "Fine!" At no time was there a sense of falling, except a slight pitching sensation when the machine was nosed toward the ground, and then only momentary, after which we watched, with a thrill, the ground coming up to meet us. We do not strike, but, touching the ground lightly a few times, we roll along the field, and soon stop without a jar, just as a hawk alights, only we don't fold our wings.

The thrill of this experience was enhanced by the thought, as we sailed out over the harbor, that immediately beneath us was the spot where the *Merrimac* and the *Monitor* fought their historic battle during the Civil War. The harbor was full of shipping of all kinds, and the warships in battle array would have presented a strange contrast could the ship of Civil War days have been alongside.

XI

Photography

In the early 'nineties I became interested in photography as a means of recording our cases. I found a box-camera at one of the photographers, borrowed it, and began to take pictures of our interesting surgical cases, and, incidentally, extended it to other subjects.

That was the beginning of amateur photography in the city. What wonderful changes have taken place in this art in thirty-five years! Now almost everybody has a camera, and, in this age of pictures, the kodak or snapshot picture is as common as if it had always existed.

With what interest we watched the development of this art from the little wooden box, with its four or five glass plates, to the pocket moving-picture camera that the tourist and traveler carries today. There was nothing more fascinating than to watch in the dark room a picture come out on the exposed plate while developing it. Now the refinements of film development have taken from us this most interesting pastime.

On my trip to Europe, in 1921, I took my kodak with me, and made many pictures of scenes by the way. On my return home I had the films developed and some hundred-and-fifty lantern slides made from them. These were shown at several Rotarian and other meetings, accompanied by a travelogue of my wanderings through Scotland, England, Belgium, and France.

When the X-ray came into use, I hastened to make use

of it in my surgical work. My first equipment was the Waite and Bartlett static machine, which was turned by hand. It was very primitive as compared with the X-ray installations of today. It did, however, show the thinner portions of the body fairly well through the fluoroscope, and it was my custom to look through my left hand while holding the fluoroscope with the right, to see when the rays were working properly. As a result, I acquired an X-ray burn of the left hand, which still annoys me at times, and shows no tendency to a cure, though it has been present as a mild dermatitis for more than twenty-five years.

My knowledge of photography enabled me to make exposures and develop plates that were fairly satisfactory. One of the early uses to which I put the X-rays was to locate a small tin whistle in a child's throat, and remove it with forceps. By having the child held before the fluoroscope both forceps and coin could be seen, and the removal was spectacular and soon accomplished. This was done on January 2, 1902.

A man later came to me with a silver dollar lodged in his esophagus behind the head of the breast-bone. After locating it by the X-rays, I attempted to remove it with forceps and, being unsuccessful, cut into the side of the neck, and located and removed the coin. Recovery was complete and uneventful.

Wonderful progress has been made in the development of X-ray apparatus, until it is now, I may safely say, our most valuable aid in diagnosis of fractures; head, spine, chest, abdominal, and pelvic conditions; the kidneys and gall-bladder; and is such a technical art that it is a specialty to itself. I have not tried to follow the intricacies of its development, but entrust it entirely to a

trained technician. So essential is it, that no up-to-date surgeon will attempt a diagnosis of most diseased conditions without the aid of the X-ray.

It is so familiar to all that it is superfluous to describe it here. When Roentgen discovered these rays, a skeptical world was slow to acknowledge the value of the discovery; but its wonderful revelations of human anatomy soon removed all doubt as to its possibilities, and it has proved to be one of the great discoveries of the age, rivaling the radio in the unseen forces of Nature that leave us in mystified wonderment as we experience their weird and uncanny manifestations.

XII

As a Citizen

One who settles in a growing frontier community and becomes a part of it cannot help being drawn into its activities. The medical man comes into close contact with individual and community problems as few in any other vocation can, and in every community the doctor will be found to have had an active part in the upbuilding of village, town, city, and surrounding country, in a social and a material way.

Some cities are built according to a well-worked-out plan, but most of them are made, as the old wood-worker used to say, by the "cut-and-try" rule. In this way much time, energy, and money are wasted, because so many things have to be changed or made over; and by the frequent change of management incident to politics and the working out of the plans and policies of each succeeding administration, the practical effect of many men and many minds.

My early training left with me a lively interest in building and in cultivation of the soil, and filled me with a desire common to most men who have lived on the farm to own and develop a piece of ground. My first home was built in 1893, and in the succeeding years I had much to do with building, both public and private, and for a long period it was a hobby with me to build something every year. I have seldom missed doing so.

I became interested in the improvement and upbuild-

ing of my town. The lumberman had left the town site shorn of almost every vestige of trees. A few scrubby ones remained, but it is noticeable that forest trees will not survive when their surroundings are cut away. They rise in long stalks, rearing their heads into the sunlight, and seem to vie with one another to get their top foliage above their surroundings; but when their trunks are exposed to the direct sunlight they die off. So the few remaining trees on the town site either died or were cut away, and for some years Ashland was almost as bare of trees as the desert. There was no shade, and the sun's rays in summer, coming down through the clear blue atmosphere, were unbearably hot.

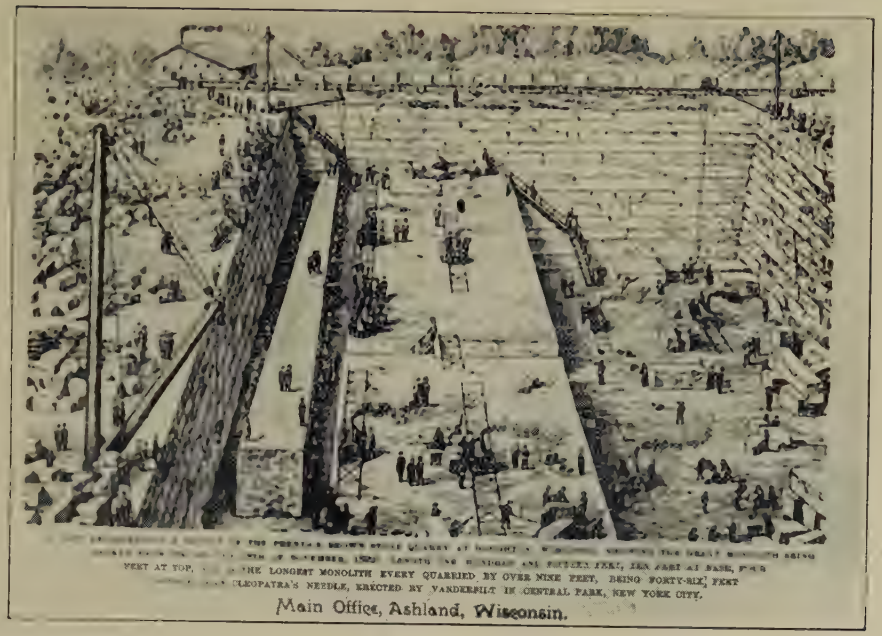
The Outdoor Art League of the city took up the work of planting shade trees. I was made chairman of the planting committee. The city subscribed liberally to the planting fund. Plans were made for boulevarding the streets and avenues, and trees, shrubs, and flowers were planted. To get quick shade, we planted Carolina poplars. They were our good friends, and gave us shade in a very few years, but have grown into disfavor on account of their very troublesome root systems, which have a tendency to invade sewers and block the pipes. They grow so rapidly and draw so strongly from the surrounding soil that very little will grow near them. They served their purpose, and are now being cut down, except on hillsides, where they prevent landslides. There is probably no better means of preventing the breaking away and slipping down of hillsides than the Carolina poplar, on account of its extensive root system.

Elms and maples were planted for permanent shade. They are of slower growth, but are ideal shade-trees. Gradually the city took on a different appearance, and

the heat of summer was very noticeably modified. The influence of trees on climatic and weather conditions is remarkable. When this country was almost an unbroken forest, thunder-storms were infrequent; but as the timber was cut away they became much more frequent. Coming from a country where severe electrical storms were common, their infrequency here impressed me. In the early days of the city the houses were mostly built on cedar posts, without basements. As it progressed, basements were dug and stone foundations put in. Brownstone was a commodity in those days, and the quarries at Pike and Houghton were active. The stone was a favorite building material, and was shipped near and far.

In the Prentice quarry, at Houghton, the largest single piece of stone ever quarried, was cut out and separated from its bed, with a ceremony that is historic. This stone, 115 feet long, 10 feet square at the base, and 4 feet at the top, lay loose in its bed, as funds could not be raised to lift and transport it. It was intended that this monolith should be taken to Chicago and set up in Jackson Park as a part of the World Fair exhibit, in 1893; but the plan was abandoned, and this monstrous stone was finally cut up into building blocks. These quarries have long since been abandoned, as concrete has entirely replaced this kind of stone. The pit where this stone was quarried is now filled with water, and national log-rolling contests are held there.

Wood was the fuel in general use in the city, and the eight saw-mills on the Ashland side of the bay provided it in abundance. It was very cheap, and could be had for little more than the cost of hauling. Some hard coal was used in residences. Soft coal is now almost the only fuel, and the soot that now mingles with the snow in


THE LONGEST MONOLITH EVERY QUARRIED BY OVER NINE FEET, BEING FORTY-SIX FEET
CLEOPATRA'S NEEDLE, ERECTED BY VANDERBILT IN CENTRAL PARK, NEW YORK CITY.
Main Office, Ashland, Wisconsin.

The Monolith

From page 120

winter, and befouls the air at other seasons, is in sharp contrast with the clean air of the wood-burning period.

My civic activities extended to the Ashland Advancement Association, of which I became the president, in which capacity I acted for several years. During this time we were making efforts to secure industries that would replace the lumbering industry, which we realized was to play out in a few years. We gave much attention to the development of agriculture. The early lumbermen declared that nothing profitable could be grown on the clay of the cut-over lands. We demonstrated that this theory was wrong, and the growth of clover along the tote-roads proved it so.

Much effort was expended in demonstrating what could be grown most profitably. Grains and root crops were tried; but clover proved to be the most reliable crop; so dairying grew as the most promising industry.

I purchased a tract of land and developed an eighty-acre farm. Others, notably Dr. A. P. Andrus, mentioned elsewhere, built an up-to-date dairy barn, the first of its kind in the community, cleared up a farm, and established a dairy.

The country rapidly settled up. The State established an agricultural experiment station nearby, which has proved to be of the greatest value to the farmers in demonstrating agricultural methods. In the location and establishment of this farm I had an active part.

My activities made me conversant with the needs of the city and its environs, and I was elected mayor in 1910, serving three years. Commission form of municipal government was a fad at that time, and the city voted to adopt it. I then retired from city politics. During my term of office I adhered to the principle that the duty of

the mayor was to secure competent men for office, men selected by reason of their fitness for office, and not on account of political influence. I declared it my policy to build up an efficient administration rather than a political organization to keep myself in office. This is right; but it is not good politics; therefore, I proved myself to be a poor politician.

It is unfortunate that, as Glenn Frank, president of the University of Wisconsin, says, "a democracy creates its leaders to destroy them." But, then, mankind is inclined to crucify its benefactors. It was ever thus, and it seems today that the only necessary qualification for office is to be able to get the majority of the votes. Commission government proved a failure in our city, which went back to the old form of government by a mayor and common council.

I became again a candidate for the mayoralty, but was defeated. However, I continued my efforts in community-building, especially at this time in the establishment of good roads as the most important factor in linking the city with the surrounding country.

Lumbering faded away as the timber disappeared, and agriculture and dairying became a substantial asset. The slump in farm values that followed has been a serious handicap in the development of the cut-over lands of northern Wisconsin; but dairying has grown substantially, and bids fair to be the most profitable feature in agriculture in this section of the State, as it is throughout Wisconsin.

In 1925 the grass crop failed for the first time in the history of the region, and gave a serious setback to the dairy industry. Many herds were depleted by sale of

stock on account of scarcity of feed, and had to be built up again by a slow process.

The State Highway Commission and the counties have built up a highway system throughout this north country that is attracting settlers and tourists and creating summer resorts. Thus, this region is becoming a popular playground for summer visitors. Much could be written about my experience in city politics, but this is not essential to the purpose of this book; suffice it to say that my political activities afforded me a wonderful opportunity to study human nature, and broadened my concept of the many problems of community welfare.

From its inception, I became interested in North Wisconsin Academy. I was elected a member of the board of trustees. The academy grew into Northland College. I was made president of the board of trustees, which position I have held for twenty years. The growth and development of the college has been one of the outstanding features of the development of the new north. The honorary degree of Doctor of Science was conferred on me by this college in June, 1926.

I am also one of the trustees of the Y. M. C. A. and director in the Vaughn Library Board. In 1904 I was elected Exalted Ruler of the Elks' Lodge, and immediately set about making plans to build a club-house that would not only accommodate the activities of this order but provide a common meeting-place for the various business and social activities of the city. Many said it could not be done; but we did it, and the Elks' Club-House became all that we had anticipated, and served a purpose during the transition of the city from lumbering to other enterprises that nothing else could have done. During my activities in the Order of Elks I was district

deputy for two years, and attended the Grand Lodge sessions at Dallas and Los Angeles. I received much inspiration from my associations in this order, whose principles are Charity, Justice, Brotherly Love, and Fidelity. The laying of the corner-stone of this building was notable, in that the ceremony was held at eleven o'clock at night, an hour when Elks salute their absent brothers. The stone was laid by Thomas B. Mills, of Superior, who later became the Grand Exalted Ruler. In 1907 I was elected to life membership in the lodge, in acknowledgement of appreciation of my service to the order.

I became active in Masonry, and was raised to the third degree by Dr. C. Eugene Riggs, noted neurologist of St. Paul, who came to Ashland for the purpose, because of his friendship for me, an honor I shall always cherish. Later on I became Master of the Lodge, had the degrees of the Chapter and Council and the Order of the Temple conferred on me, then took the thirty-two degrees of the Wisconsin Consistory. I passed through the chairs of the Commandery, and was elected Commander in 1912. Having passed through the official line of the Grand Commandery of Wisconsin, I was elected Grand Commander in 1927.

These various civic and lodge activities, of course, occupied a considerable part of my time, but were not allowed to interfere with my professional work. They comprised my recreation. I took very little time for sports or other pastimes.

My lodge activities have afforded me much inspiration that has kept my ideals high and given me many contacts with worth-while men that I could not have otherwise had.

In 1913 I built a small office building on the main street, near the hospital with which I was connected. In this I formed the nucleus of a clinic. It was the first effort made to form a clinical group in the city. With me were associated Dr. C. J. Smiles and, later, Dr. M. L. Young. Emelia C. Peterson, R. N., was secretary; Laura Gilman, laboratory technician.

The arrangement was satisfactory for a time; but it became evident that group-practice, to be satisfactory, must have more members, so that the specialties could be covered in a more efficient manner. I secured some corner property in another part of the city, and built, in 1920, a building 36 x 80 feet, with two stories and basement, affording room for seven doctors, a dentist, a physiotherapist, and a laboratory. We moved into it in April, 1920, announcing it as the Ashland Clinic. However, we had not incorporated. At this time a competing group was formed; and they immediately incorporated under the name we were already known by. It was an out-and-out theft of name so flagrant that I would not even attempt to regain it, but incorporated under the name of "The Clinic." My aims and efforts to introduce group-practice into the community are detailed at some length in a chapter farther on. However successful I may have been, or how short I have come of the goal, my efforts have at least been appreciated by the profession throughout the country, and my greatest asset today is the confidence and friendship of a wide acquaintance both in and out of the profession.

XIII

Northland College

The needs of a pioneer country are soon recognized by philanthropic and far-seeing men. Churches and schools are among the first provided for. When northern Wisconsin was being stripped of its forests of pine, towns and rural communities sprang up. Hardy pioneers were establishing themselves, with means of communication limited to the railroads and tote-roads of the lumbermen. Thus isolated, they established homes and reared their families.

Educational facilities were crude indeed. The district school was the limit to be reached by many boys and girls, though their desire for education and their capacity for learning were perhaps greater than that of the young people in more favored sections. In order that these young people people might have opportunities commensurate with their capabilities and their ambitions, a group of men met with Mr. C. H. Pratt at a village bearing his name, now Grand View, Wis., and formed an organization that later, in 1891, met at La Pointe and crystalized into a definite plan from which resulted North Wisconsin Academy. I attended the La Pointe meeting, and my interest in the school grew from that time. I was elected a member of the board of trustees on June 13, 1899.

The school was intended to provide high school education to the boys and girls of the rural districts and towns, which had no high schools. Funds were collected,

Northland College, Trustees, Faculty, and Students, 1926

Facing page 126

and a school was built on the outskirts of Ashland. It was named Wheeler Hall, after the Wheeler family, who had been missionaries at La Pointe as far back as 1841. The corner-stone was laid on July 14, 1892, and the building rapidly followed. The school grew amid great difficulties. Many times it seemed it must give up for want of financial support, but a few loyal souls stood by it and, at great sacrifice, kept it going. It gave opportunity to many ambitious young people to get an education, and paved the way for them to enter colleges and universities, where they could build on the foundation laid in the academy.

In 1907 a college course was added, and the academy became Northland College, under the presidency of M. J. Fenenga, who continued in that capacity until 1914. Boys and girls were provided with means to earn their way through school. Many industrial enterprises were added to the curriculum and part-time employment found for students among the people of the city.

The college grew. Its alumni increased from year to year, and the graduates went out to their respective communities, prepared for leadership in the Americanizing process of this great melting-pot of nationalities. Its mission, heralded far and wide, brought to its support means necessary to sustain it. Even far New England became its staunchest supporter. Fostered by the Educational Society of the Congregational Church, it was kept non-sectarian, and all creeds and many nationalities were welcomed within its walls.

Through the benevolence of Mr. M. T. Dill of Prescott, Wis., Dill Hall was built for the girls; and the Henry Woods family of Boston provided means to build Woods' Hall for the boys. Dill Hall burned in 1926,

and plans were made and consummated for the erection of a girls' dormitory, which adds architectural beauty to the group of buildings on the college campus. The corner-stone of this hundred-thousand-dollar building was laid on June 12, 1926, and the dormitory was opened for students January 10, 1927.

As one writes on this subject, such a vast amount of material rises before one's memory that it is a disappointment not to be able to occupy sufficient time and space to make the story complete.

From this college have gone forth many who have made their mark in the world; for it is just such young people with determination to get ahead that are doing things worth while in the world today. It has been my honored lot to have served on the board of trustees of this college for many years and to have been president of the board for the past twenty years.

It has, therefore, been my pleasure to confer the degree of Bachelor of Arts on many fine young people who are in successful pursuits, attesting to the worth of this pioneer school. Among others who have been honored, I received the honorary degree of Doctor of Science in 1925, and a year later had the honor of conferring the degree of Doctor of Laws on A. W. Sanborn, for years a faithful and devoted member of the board of trustees, as well as a leader in the development of northern Wisconsin.

Of those upon whose shoulders the burden of developing and supporting Northland College, its president, Dr. J. D. Brownell, heads the list of a long line of men and women with a vision and a purpose. Some have passed on without seeing the fruits of the seed they have sown;

others have wearied and have given their places to those interested, while still others remain faithful and work unceasingly in a cause they regard as worthy of their best efforts.

The first session of North Wisconsin Academy was held in the Vaughn Library building, in 1893, with the following faculty:

Literary Department

Samuel T. Kidder—Principal.
Miss Grace L. Gibson, Ph. B.—Lady Principal.
Chas. L. French, A. B.—Instructor in Mathematics and English.
Alonzo T. Mendum—Instructor in Business Branches.
Miss Mabel Thomson—Instructor in Mathematics and History.

School of Music

A. W. Collins—Director

Pianoforte—A. W. Collins, Mrs. Mary Collins
Voice Culture—A. W. Collins
Lecturer and Musical Advisor—Mr. W. M. Cross
Violin, Violincello, Viola, and Contra Bass—Herr Fritz Schlacter
Banjo, Guitar, Mandolin, and Zither—Miss Ellen Hope
Harmony and Theory of Music—A. W. Collins, Mr. W. M. Cross

Faculty—1928

W. C. Hitchcock, D. D.....Dean
T. N. Bobb, M. A.....Science
G. L. Lewis, M. A.; B. T. S.....History
J. T. Kendrigan, B. S.....Mathematics
N. B. Dexter, M. A.....English
S. T. Dexter, M. S.....Chemistry
E. E. Speicher, Ph. D.....Education
Ida B. M. Dent, M. A.....Classic Languages
J. A. Fortier, A. B.....Economics
A. C. Bro, M. A.....Education
S. L. Green, A. B.....Piano

F. I. Schweppe, B. M.....Voice
Catherine Cutler, M. A.....English
Harriet Harmon, M. A.....French
Kate M. Kepler, A. B.....German
Irving L. Winslow.....Violin
J. D. Brownell, D. D.....President
Lena M. Everest.....Matron

The first Board of Trustees were the following:

Rev. G. W. Nelson — Rev. A. D. Wright
Rev. Fred T. Rouse — E. A. Shores
Dr. Edwin Ellis — E. P. Wheeler
Rev. Walter M. Ellis — E. P. Beebe
C. H. Pratt

The first meeting was held Feb. 23, 1892. I was elected a member of the board June 13, 1899.

The present Trustees are the following:

Peter Hanson — J. A. Watson
A. P. Andrus — H. H. Fuller
J. M. Dodd — A. T. Pray
A. W. Sanborn — W. C. Hitchcock
G. A. Johnson
All of Ashland

And J. P. Deane, Beloit; W. A. McGonagle, Duluth, Minn.; M. T. Dill, Prescott; H. E. Peabody, Appleton; G. J. Van de Riet, P. L. Evans, Chicago, Ill.; J. A. Stolp, Chicago, Ill; E. P. Wheeler, Aurora, Ill., and J. D. Brownell, Ashland, Wis.

To attempt to mention the many loyal friends and supporters of the school during the thirty-six years of its existence would be a difficult matter, and to tell what they did would require a volume.

I therefore leave the subject, feeling that I have given a glimpse of the past and the present of Northland College,—an institution to which I have given my undivided support for more than a third of a century.

XIV

London in 1914

It had always been my desire to see Europe. To cross the ocean was a dream of my boyhood and youth that seemed too wonderful to be realized; but in 1914 I made the trip with Fellows of the American College of Surgeons, which held its annual congress that year in London. The trip was made in company with Dr. John H. Rishmiller, chief surgeon of the Soo Railway, and as I was president that year of the Surgical Association of that railway, we had much in common.

We sailed from Quebec, after having had the opportunity to see that quaint and historic city. The St. Lawrence and the country through which we passed brought to mind the historic lore of that region, that we had read at school. The fogs and the icebergs beyond New Foundland were the outstanding features observed, and we hailed with delight the first sight of land, which was the rugged west coast of Ireland.

Landing at Liverpool, we were rapidly transported over the London and Great Western Railroad to London, where we were soon located at the Hotel Cecil. Then began an intensive series of clinics in the various hospitals of the city. We were treated most courteously by the English surgeons, who are called "mister" and not doctor,—the latter title being accorded the physician. With their warm, kindly, yet dignified hospitality, they

showed us their work, which was done in accord with the best theory and practice of the day.

As I look over the notes I made during these clinics, I find some customs I did not observe in this country. Many of the hospitals had the sterilizers in the operating-room. Drain-pipes ran from the sinks down to an open drain in the floor along the wall. There were warmed operating tables. Operating-rooms were not heated as we heat them and, in a climate that is neither very warm nor very cold, hospital heating is not such a problem as it is with us, especially in the northern part of our country.

An open fireplace was observed in one hospital ward with the chimney running down and out under the floor. Surgeons operated in street clothes covered by a rubber apron. Some removed their collars; but all did not. Several wore rubber boots. They wore caps variously shaped, but no masks. Sterilization and disinfection were carried out much the same as it is today in our country. Rubber gloves were generally used while operating, and one surgeon told us they were brought from America. Sea sponges were still being used. The surgeons seemed to get good results from their operating, and wounds of operation were seldom infected.

Before the week was over, the war came on like a storm from a clear sky. As we sailed down the Irish Sea to Liverpool, the only trouble apparent in the world seemed to be occasioned by the landing of some firearms in Ireland by one of the contending factions in that trouble-ridden country. No one of our party suspected, nor did the newspapers indicate, that the terrible storm was brewing that broke a few days later.

With the end of the week in London, and the gather-

ing of the war-clouds, we made plans to return home as quickly as we could get away. On Sunday, Parliament remained in session all day, and we awaited anxiously for news of its action. Trafalgar Square was crowded that day. Groups were being addressed by speakers, and the whole atmosphere of the city was tense and expectant. Cries of "Down with the Kaiser!" were frequently heard. The doctor and I wandered about the city, and incidentally went to see Ambassador Page; but he was in the country that day. His secretary could give us little assurance of getting home. He said, "Within forty-eight hours Britain will be at war, and no ships will be permitted to leave a port in England. I would advise you to settle down and wait patiently, and in six weeks or so the United States will be able to get ships over here to take you home."

This was not a cheering prospect, so we spent the next day calling on the various steamship companies, soliciting transportation. We had our return booked on the *Vaterland,* but as that vessel was tied up on this side, we changed our booking to the *Imperator,* also of the Hamburg-American Line. That ship, too, was taken off the list. We finally succeeded in getting passage on the *Tunisian,* which was to sail on August 5th.

The spectacle of people rushing into London from the Continent was one that cannot be forgotten. The difficulty of getting American checks and money orders cashed; the care the English made to keep gold from being carried out of the country; the scramble for reservations on the few outgoing ships; the distress and panic of people trying to locate relatives and find their baggage, added to the general confusion. It was said that there were then one hundred thousand Americans on the Con-

tinent trying to get home and London was the point of mobilization. One of the rumors was that London was to be attacked from the air, a prediction that later came true.

The day after England declared war, I stood with a crowd on the street, when a loud explosion came from the air above. Looking upward, expecting to see an airship, we saw instead a small cloud that had not been observed before. The noise was thunder from this cloud. The sudden appearance of clouds and rain in England reminds one of the saying of someone that "The English sky is so sensitive that it weeps if you look at it."

That night, toward morning, I was awakened by a measured tread of feet on the pavement beneath my hotel window. I got up and looked out, and there, in the dim light, I saw the street filled with soldiers marching by, with no sound but an infrequent command and the dull thud of hundreds of feet, as with measured tread they marched by. I have often wondered how many of these poor fellows returned from France.

I will never forget the calm, determined spirit of the English people with which they met the emergency of war, with constant news of the advancing victorious German army through Belgium and into France, with a force that nothing could stop.

We embarked from Liverpool on the afternoon of August 5th, and reached the northern point of Ireland about noon the next day. There we were held up, the ship standing by wig-wagging signals to Malin Head until four o'clock in the afternoon, when we headed out into the cold, murky sky of the northwest. We had many rumors of the cause of the delay. Our ship was equipped with wireless, but it was not put up and used until later,

on the trip. As the Germans were already looking for British shipping, the wireless would have doubtless revealed our position to them. It was rumored that the German cruiser *Dresden* was in the North Atlantic and would probably be looking for us, to get our coal. We did not expect any more serious molestation from them.

It was said that before leaving Liverpool the good Welsh coal had been removed from our ship and replaced with a poorer quality, in anticipation of losing our fuel to the Germans; but the prospect of floating around in the Atlantic without steam was not agreeable to anticipate.

Our ship headed out to the northwest—it seemed bound for Iceland—to keep out of the usual lanes of travel. At night the port-holes were closed and cloth placed over them. No lights were permitted except candles, which might be used in the interior of the ship. It was cold, and the damp sea-air, with the uncomfortable crowding of the ship, made the ten days required for the trip from Liverpool to Quebec anything but enjoyable, except that we rejoiced that every day brought us a little nearer home.

Vigilance relaxed somewhat as we approached this side, and we finally reached port without serious incident.

This particular congress of the American College of Surgeons was unique in its experience, and the organization will probably never see the like again.

XV

The Medical Board

In 1913 I was appointed to the Wisconsin State Board of Medical Examiners, and in 1915 was elected secretary, in which office I continued until 1924, when my successor was appointed.

My acquaintance with the profession of the State had been rather extensive, and my associations as a member of the Board enlarged that acquaintance. I enjoyed very much my contacts with both young and old practitioners throughout our own and the bordering states and the opportunities that came to me to be of service to them.

My experience on this Board enabled me to view from many angles the politics of the State, and my efforts to keep politics out of the Board and to require even the Governor to make his appointments to it, in accordance with the provisions of the law, cost me my membership on it.

The law provided that the Governor should appoint from lists submitted by the three medical societies of the State. Governor Blaine ignored this law, and appointed a doctor who was not on the lists and was *persona non grata* to the profession of the State. The Board refused to recognize the new appointee until the Attorney-General should pass on the legality of the appointment. His decision was that the appointment had not been made legally; so matters drifted on until the law changed, giving the Governor the power of appointment without the

former restrictions. He again appointed his man, and never forgave the Board, and especially me, for having presumed to question his appointive power.

When I became secretary, the records came to me in trunks and boxes. We systematized the records, instituted a filing system, and started a new plan of attaching to each application for license a photograph of the applicant and of his or her diploma and other credentials. I advised all doctors to have their diplomas photographed and copies of them kept in a safe or a safe-deposit-box, where they could not be destroyed. This was suggested by the difficulties which often rose from the loss of diplomas by fire, in which case they could not be replaced. A photograph of the document would be the best possible substitute for the original.

I look back at my experience on the Board as one of the most pleasant reflections of the past. Its work was always "on the square." I never knew anything crooked to be undertaken until Governor Blaine's illegal appointee attempted some things that were shady and which the Board immediately sat down on. I have the highest respect and friendship for all the members with whom I was associated on this Board.

In my work as Secretary I was ably assisted by my secretary Miss Emelia Peterson, a young woman of very unusual capabilities; and the systematic conduct of the Board's affairs was very largely due to her. She was my secretary for fifteen years, and was invaluable to me in all my professional activities.

As an example of the objects and aims of this Board, the passage that follows is an extract from a paper I read before the State Medical Society of Wisconsin, in 1918, while an active member on the Board:

Laws regulating the practice of medicine have a twofold purpose. Primarily, to protect the public against incompetent or dishonest practitioners; and, secondarily, to protect the reputable practitioners who have prepared themselves by a long laborious and expensive course of education and preparation, and are honestly trying to prevent, relieve, and mitigate the physical ills of their fellow-beings. There has always been hanging to the skirts of the medical profession a varying number of cults, healers, and so on, who soon get to the point that they believe is the acme of medical knowledge, and endeavor by all sorts of short cuts to get into the circle where they may be considered on an equality with the educated and competent doctor. They seek, not to rise to the heights of scientific achievement, but rather to bring all else down to their own level.

There is ever the charm of the miraculous; the lure of the mystic; belief in spiritual endowment and Divine call that appeals to the afflicted, and calls into service a class of practitioners who are willing to administer to or impose upon them. There are some of these cults that might be useful branches of the great tree of medical knowledge; but the trouble with them is that they believe themselves the main trunk, and that the regular medical profession is only an organized group seeking its own protection. Much capital is made by these people out of the expression Medical Trust, seeking thereby to invoke the common dislike of trusts and, in true Bolshevistic style, bring distrust upon the real benefactors of mankind. Unfortunately, education and enlightenment have not yet removed us from the sphere of their influence, for some of the most educated and refined are among the most ardent devotees of the rankest quackery.

There is another class, educated as the rest of us, understanding human nature better than the most of us, commercial in spirit, selfish by nature, believing that the one thing worth while in life is money, and who, to acquire it, are willing to prey upon the frailties of humanity. They are cunning advertisers, and play the game well. They are always with us; and though we are at times in despair of ever being rid of them, the advertising quack is undoubtedly becoming less numerous as his activities are restricted by law and his methods are brought into the light of day. To this class the credulity of the people is a rich asset, and the imaginary

more than the real ills of humanity supply an abundant harvest. Laws regulating the practice of medicine are now operative in all the States, but each has its own, and the lack of uniformity in them makes it necessary to administer each separately, therefore there is a department in each State, the function of the department being the enforcement of the law. . . .

To do away with the laws regulating the practice of medicine, thus giving a free hand to the quack and the charlatan, would reverse all incentive to real scientific medical work, and few men of scientific attainment would want to be in a profession among such associates. Medical science would soon drop back a century or more; and we must not forget what has been accomplished by science during the period of the past half-century.

The generation coming has inherited a priceless boon from the one now leaving the stage, and as we pass along our achievements, with those of our colleagues and predecessors, let us see to it that mankind shall be assured of a continuance of the blessings true medical science has conferred upon the human family.

XVI

War Service

Realizing that the transpiring events would, without doubt, eventually involve us in the war, I applied for and received a commission as first lieutenant in the Medical Reserve Corps of the United States Army, on July 3, 1916; was promoted to captain on October 3, 1917, and became a major on March 21, 1923. My only active duty was a fifteen-day period of training at Camp Custer, in August, 1923, though I probably rendered a greater service during the war, as I was situated, than I could have done in any other way. I was a member of the Wisconsin Council of Medical Defense, and one of our meetings during the war was with General Gorgas, in Washington. I helped to organize, and became, a member of the Medical Veterans of the World War.

At the outbreak of the war I was secretary of the Wisconsin State Board of Medical Examiners, and was thus in close touch with the profession throughout the State. I was immediately appointed on the Draft Board, and a little later was transferred to the Medical Advisory Board, composed of the following members:

Medical Advisory Board for the Ashland District

Chairman—John M. Dodd
Internist—Adellon P. Andrus
O. A. L. R.—Archibald O. Shaw
X-Ray—Clyde J. Smiles
Laboratory—Laura Gilman
Dentist—F. D. Brennan

In Front of Medical Service Building

Facing page 140

This board met daily, except Sunday, at my Clinic. Miss Laura Gilman, our laboratory technician, was made secretary. Nearly one thousand referred drafted men were examined by us, without any expense to the government except for the paper furnished us for records and reports. The clerk was allowed a salary; but it was not accepted. We were all anxious to serve. I joined every organization I could that had to do with the activities of war; and, when the needs at home seemed to be provided for, I asked for active duty with the troops; but the war ended with the Armistice, soon after.

Miss Emelia Peterson, my secretary, was the first Red Cross nurse in the city, and rendered valuable service to her organization. She was also most helpful in the work of the State Board of Medical Examiners and the State Nurses' Association in their war activities. Our Clinic was made headquarters for all the medical activities pertaining to recruiting and service.

I became active in recruiting the doctors in the northern part of the State into the Medical Corps, and was made examiner of applicants for commission. We furnished medical and surgical service and supplies to every man in uniform, without charge, and operated frequently on men to remove the cause of disability for service. I was later commissioned in the United States Public Health Service, and put in charge of marine service at this port; and still later was placed in charge of the Veterans' Bureau for this district. It was my privilege to recall into practice some of the medical men who had retired from practice, so that home communities might have service when the younger men went into the army.

During the war I received, through the courtesy of Sir

Gilbert Parker, the author, a great many publications pertaining to the war,—printed in England. The books and pamphlets make a most interesting collection, which I have recently presented to the American Legion, and it is now a part of their historic collection.

It was a matter of deep regret to me that I could not take an active part in the war at the front. My experience in emergency surgery should have made me useful in service to the wounded; but the war did not last long enough for men to find the places where they could fit in best. The misfits were a source of severe criticism from many sources. Like many others, I served where I was placed, though I could have done more work, and better, somewhere else.

Though the military had always appealed to me, active duty did not seem to fall to my lot. I had asked for an appointment in the medical service of the Spanish-American War, but was informed that my application would be placed on file for future reference, if necessary. The war was soon over; the necessity did not arise.

I quote from a paper which I read before the Wisconsin State Medical Society in 1920 on "The Doctor Who Stayed at Home," which I believe is a true picture of the majority of the doctors who did not go to the front.

> The doctor who served at home saw at close range the effects and realities of war,—had to help build up the army and serve in innumerable ways more important than the service performed at the front, yet received none of the plaudits heaped upon the returning soldier by a grateful and admiring people.
>
> The doctor must serve on the draft board and conduct that part of the examination which should determine physical and mental

fitness for the life of the soldier and, figuratively speaking, keep the weak timber out of the ship.

He served on the draft board,—the medical advisory board, the district board, and as a recruiting officer for the Medical Corps. In all these he must be instructor and advisor. His advice was continuously sought by, and freely given, to the drafted men and their families and relatives. The families of absent soldiers were his charge, that the absent one might have some grains of comfort in the thought that those dependent upon him at home were being cared for with true paternal interest.

He gave attention to the increase of hospital facilities, that the sick might be better provided for and that the soldiers coming home with wounds and disease might find the very best service awaiting them. He gave attention to the communities depleted of their medical men, and whenever possible secured for them adequate medical service, and redoubled his efforts when the dread flu epidemic came with a terror that exceeded that of war.

If he were a doctor who had retired from active practice, he again took up work, so as to serve. If he were a specialist, he increased the range of his activities, so as to be of the greatest possible service. He gave his services without pay to every man in uniform, and impressed every soldier that it was a pleasure to serve him while he was serving his country. The Red Cross, the United War Charities, and every other activity tending toward war relief received the active and loyal support of the doctor who stayed at home.

As all doctors who saw active service at the front did not return unscathed, neither did the doctors who stayed at home escape untouched by the unseen enemies with which they were at war, as is attested by the long list of victims of pneumonia, and other conditions incident to the flu epidemic.

It takes real courage to fight an unseen foe, the tangible evidence of whose presence is only manifest by casualties.

The war demonstrated one thing beyond all doubt,—that personal courage has not waned with the progress of civilization. This was proved by the utter disregard of personal safety and the reckless defiance of death through innumerable instances during the war, and the members of the medical and allied professions

manifested that they lacked none of the sublime attributes of courage. In the air, on and under the earth, on the sea and under its surface, the deeds of men surpassed the fables of old, and all the ages past looked down and wondered if they had ever seen brave men before.

Much is known of the doings of men and women, both at home and at the front, and much more will never be known, unless in some way the recording Angel will reveal to future intelligence the deeds of men who did their duty, though in obscurity. When this time comes, the doctor who served at home will stand, with Abou Ben Adhem, as one who served as well as loved his fellowmen.

The Armistice halted our program for the progress of the war, and the country set about the herculean task of returning to peaceful, pre-war pursuits. I need not comment on it here, as it is current history, familiar to all.

In 1920 I built my Clinic Building, which was to accommodate the activities of a select group of practitioners, some of whom had been in active service at the camps, for whom I desired to make places in order to compensate them in a measure for the sacrifice they had made in leaving their practices to go to the front.

The work of the Veterans' Bureau was centered in our group, and continued until the service was contracted into a smaller number of stations, the work of our section being taken to Eau Claire.

Responsibility for the success of the Ashland General Hospital fell heavily upon my shoulders, and continual sacrifices were necessary to develop and maintain it. Many obstacles were placed in its way by those favoring the competing hospital, which lukewarm friends made no effort to remove. There were, however, enough staunch friends who shared my belief in the mission of our hospital to make it grow and develop in spite of difficulties.

It is now recognized as a first-class hospital, and the State University has placed its seal of approval of it by making it one of the preceptorial stations for the training of seniors in the medical department.

XVII

Europe in 1921

Not having been permitted to see Europe during the war, I had a great desire to observe the effects of that great struggle, and made plans to go with the Rotarians to their International Convention at Edinburgh, Scotland, in June, 1921, and then tour briefly England, Belgium, and France.

There is a group of Rotarians who will recall quite vividly the post-Convention tour taken after the Edinburgh Convention in 1921 through Scotland, England, Belgium and France; the land of Walter Scott, the English Lake country, the Shakespeare home, the environs of London, including Stoke Poges, where Gray wrote his immortal Elegy. Of Eton, Oxford, Windsor Castle, and Hampton Court we caught but a glimpse, but saw enough to receive impressions that made reading of these places interesting as it had never been before and inspired us with the desire to go again and spend more time.

There was little to remind us of the war until we reached the Continent, with the exception of a great park of field transport we passed in the suburbs of London; with here and there the effects of the German air-bombs, the effects on one object, in particular; the Egyptian obelisk on the Thames embankment, the granite base of which was dented and scarred by the fragments of a bomb, which fell a few feet away, tore up the sidewalk,

turned over a tram-car, and killed several people. The sphynxes which guard it were perforated in places by the bomb fragments. London, in 1921, seemed to be pursuing her way pretty much the same as before the war.

Rural England late in June presents a most beautiful panorama of Nature at her best; and to ride in a motor-car over her splendid roads, or on one of her swift and smooth-running trains through this historic country, is indeed a privilege, especially to those of us who trace our ancestry to the British Isles, and have read and re-read their historic lore.

A four hours' ride across the Channel, from Dover to Ostend, brought us within sight of the ravages of war. The low, sandy coast of Belgium, as it came into view, revealed a row of buildings miles long, from which the windows had been shot out; but, strangely enough, the walls were standing, grim, eyeless objects, to which the population had not yet returned.

It was Sunday afternoon, and the beach was thickly dotted with bathers. It seemed that a goodly number of Belgium's population had come that day, as is their custom, to disport themselves in the surf at that Atlantic City of Europe, as it is sometimes called. The city was in the midst of reconstruction of its war-wrecked buildings. On the right of the dock where we landed lay the *Vindictive,* almost submerged, where it had been dragged after having closed one end of the Zeebrugge Canal, to bottle up the German submarines. What a thrilling history this old ship has!

On the sand-dunes, which rise some distance from shore, were gun-emplacements, where German guns of large calibre had been stationed, to command all that part of the Channel within their range. Some of these guns

remained in position, but all had been disabled before they were abandoned. These emplacements,—built of concrete, containing magazines and quarters for the men, with passageways running underground,—were an interesting commentary on the patience and industry of the German soldiers. They impressed us as having been built as permanent monuments to the glory of Germany's military power.

In the dark cavern of one of these forts there was a well, with the top open on a level with the floor. Into this one of our party stepped, and had it not been for a rod that crossed the tube a foot or two below the surface, he would doubtless have found a place amid the rubbish, some twenty feet below. This well was doubtless a source of water-supply to the occupants.

A few miles out of the city is the great gun "Long Max," which had a range of twenty-eight miles and a calibre through which a man could crawl. Set in a concrete emplacement, surrounded by a reinforced concrete wall from five to ten feet thick, it appeared as a monster, mired, then left to its fate. The Germans before abandoning it had depressed its muzzle and fired it, with the evident intention of wrecking it. Instead, an enormous section had been blown out of the wall, and the gun appeared not to have been injured.

Ostend is typically Belgian: on all sides appear the evidences of thrift and the industry of the people. Passing out into the country, one is impressed by the areas of cultivated grain. No available piece of ground seems too small to plant, and the grain is cut and harvested by hand. The scythe and sickle were common objects. Further back in the country, harvesting machinery was seen. It was harvest-time, and the grain-fields and plots showed

the grain standing thickly and of even height, due to the high state of fertilization and cultivation of the soil.

The streets in the Belgium cities are largely paved with cobblestones, and one who purposes to do much walking about, had best supply himself with shoes with heavy soles. The Belgium farm-wagons anticipate this. The tires are twice as wide as ours, and they have a peculiar custom of hitching the team to the end of a short wagon-tongue, while the driver walks beside the tongue,—with one hand on it to help guide the vehicle. The Belgian horses are heavy, sturdy animals. The dog is much used as a draft-animal, and the milk-cart drawn by a dog is a familiar sight.

The schools with men as teachers interested us greatly, for many of our party were teachers and professors. At the hotel we offended the landlord and his lady by singing in the dining-room. They felt we were taking an undue liberty and showing them disrespect. Doubtless they will have learned by this time that this is a Rotarian custom.

Out of Ostend, by motor bus down to Ypres, we passed through the Flanders' fields where trench warfare raged so long. On all sides trenches, wreckage, concrete emplacements, shattered trees, and a terrain overgrown by weeds told of carnage wrought by the destructive ingenuity of men engaged in deadly warfare. Through Dixmude,— with its canal destroyed and scarcely a house standing,—the populace had gathered in the main street, where, under almost any kind of a shelter, they were selling their wares of all kinds, from fine laces to cheese. They were patiently, stoically coming back from the inferno through which they passed.

On to Ypres, with its gray stone wreckage little re-

sembling a city, with great piles of stones, which had formed the buildings, being ricked-up along the streets as the work of reclaiming and rebuilding the city slowly progressed.

On to Antwerp, and a brief glance at its wonderful architecture and paintings. To Brugges, the Venice of Belgium, where you pass along the streets in boats. To Zeebrugge, where the great sea wall, a mile long, encloses the canal. Those who visit it will learn a fascinating story.

To Brussels, with its wonderful architecture, which must be seen to be appreciated. Sculpture everywhere. Out to the fields of Waterloo, twelve miles from Brussels, where one climbs the two hundred and twenty-six steps to the top of the great mound, which occupies the center of the battlefield and which was built to a height of one hundred and sixty-five feet of the earth from the field where one of the decisive battles of the world was fought. Diverse and crowding thoughts occupy one's mind as he gazes musingly upon the panorama surrounding him. One should not leave Belgium until he has seen Waterloo.

Those who go to Ostend now will doubtless find many changes in the conditions described; but Belgium will not be less interesting for that reason, and they will bring back, as we did, memories of a most delightful and interesting visit among a hospitable people, in one of the world's most interesting countries.

Our tour continued on to France: to Paris, Versailles, Château Thierry, Belleau, and Reims. Our time was too limited to permit us to visit other historic places; but we saw enough to satisfy us as to the horrible possibilities of war. So much has been written about the places

mentioned, that to record here what we saw seems needless repetition. My companion, James H. Kaye, president of the Marquette Normal School, shared with me an active interest in things of past and current historic importance, and we made the best possible use of our time. Together we gazed on the Panorama of Paris from the top of the Eiffel Tower. We saw the palace gardens and playing fountains at Versailles. Our party held a Fourth of July celebration at the village of Belleau, from the front steps of a ruined château. We saw the wine cellars of Reims, where, in the fifteen miles of tunnels, eighty feet under the city, were contained twelve million bottles of champagne, which were said to have held fifteen million bottles when the Germans first occupied the city. It was said that almost the entire population of Reims took refuge in these tunnels, and that school was conducted down there. These tunnels are cut out of the chalk formation underlying the city, soft enough to be easily cut out, and strong enough to support the weight above. These passages are some fifteen feet wide and of about the same height, the roof being a Gothic arch. Fort Pompelle, in the champagne country, some eight miles east of Reims, was a mass of white hills and hollows, with wreckage of the structure scattered about and its underground passages showing their black interiors here and there.

Reims Cathedral was a center of interest. We found it not so badly wrecked as we had expected to find it, and repairs were well under way. The enterprising populace, intent upon its restoration, had booths near-by, where contributions were freely given and received. No doubt this magnificent architectural structure will be restored to its former beauty and splendor.

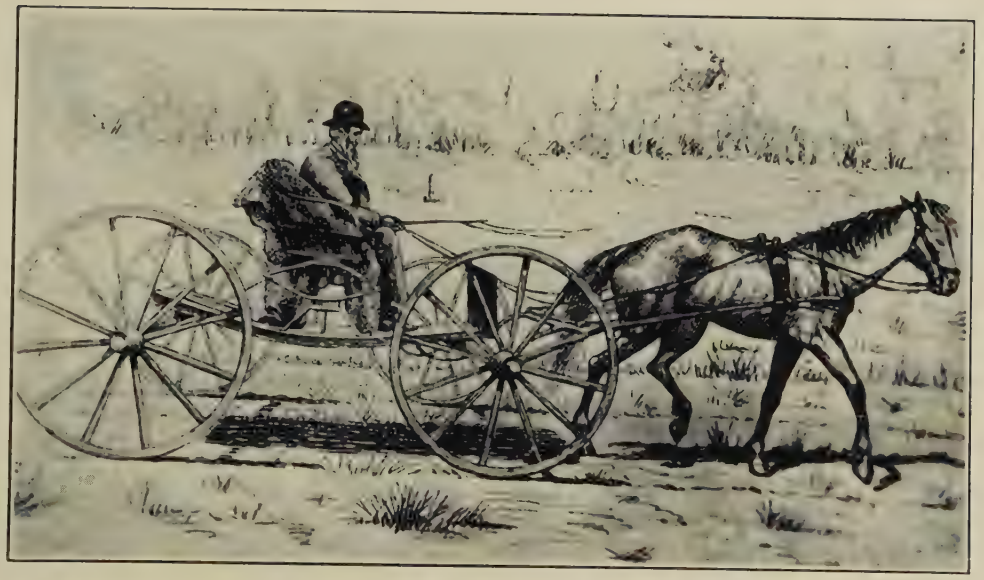
The old architecture of Europe is most interesting

in many ways, one of which is the amount of statuary, both built into outside walls and in the interior. It speaks of the art of past ages and the infinite pains that were taken in carving and sculpture. Many interesting conjectures are woven into one's musings as he contemplates the skill of those old craftsmen. We were told that much of it was done by monks, who devoted their lives to this work and received only the bare necessities of life for their labor.

Our minds filled to overflowing with the impressions we tried to accumulate in a few days. We left Paris and set sail from Havre for home, feeling that we had had a glimpse of the past and scenes of the present, and were admonished by the destructive effects of war in life and property, that there must be means of settling difficulties other than the resort to war, with all its attendant horrors.

One, however, cannot look back at the history of the human race and feel that we are through with war. If one believes that the militant spirit is dead, or even sleeping, let him consider the interest manifested in the prize-fight, or the desire to use personal violence which arises in the differences men have with each other. Nations are but men in mass. As a man is less liable to attack if he is known to be armed and skilled in defense, so will a nation prepared for conflict be less liable to be involved in war.

I am, therefore, a disciple of preparedness, take a lively interest in the C. M. T. C., wishing all the time that I had been offered as a boy the chances for camp life and training that are urged upon the boy of today, with so few who will accept. I have also organized and am president of the local chapter of the Officers' Reserve Corps of the United States Army.



Dr. Edwin Ellis in His Buckboard

Facing page 153

XVIII

Some Doctors I Have Known

I HAVE a feeling that these memoirs would fall short of their object without some personal glimpses of the men of my profession with whom I came in contact and who, in no small measure, influenced my career.

There was Dr. F. H. Sharpneck of Jefferson, Pa., who befriended and encouraged me on many occasions; Dr. W. F. Shumaker of Butler, Ind., who was my roommate while at Starling, and who has been a friend in all the name implies; Dr. C. W. Hopkins, chief surgeon of the Chicago Northwestern Railway, Dr. J. H. Rishmiller, chief surgeon of the Soo Line, with whom I made the trip to London in 1914, and who shared with me the tour of the London hospitals and the difficulties of getting back home when England entered the war; Dr. Reineking of Milwaukee now dead, with whom I climbed Bunker Hill Monument, and wandered over *Old Ironsides* in Boston Harbor; Dr. C. E. Riggs of St. Paul, who raised me to the third degree in Masonry; Dr. Archibald McLaren of the same place, chief surgeon of the Omaha Railway, a lovable man, with whom I had many pleasant associations; also Dr. C. A. Wheaton of St. Paul, a leading surgeon of his time, whom I learned to know and admire as a real man, and whose advice and counsel helped me out of some difficult places.

I enjoyed a passing acquaintance with Senn, Murphy, Ochsner, and many of the surgeons of Chicago. Dr.

John M. Dodson, with whom I share the same initials, I often meet, and he seems nearer to me than a passing acquaintance. I have enjoyed the hospitality and have watched the work and progress of the Mayos. The phenomenal institution they have built up is one of the wonders of this age, so fruitful in wonders. I could name many more in my profession from association with whom I have had both pleasure and profit; but those I have mentioned stand out prominently as the sweep of memory goes by.

As I come nearer, there are many I would like to mention; but of my immediate associates there are a few whose loyal friendship has notably smoothed the rugged pathway for me as well as many others.

Dr. Rinehart to whom I have already referred, was a high-class surgeon, well educated, a courteous gentleman, and a progressive scientific investigator. Together we worked out many problems of principle and practice, and I helped him to acquire an enviable reputation throughout the northland. He died before his time, of an obscure malady, and it was my privilege to be with him during his last moments, in the Augustana hospital, in Chicago, where he had gone to find relief at the hands of Dr. Ochsner.

Dr. Andrus is the ideal family doctor. My association with him began in 1891, and has continued through the years. He has passed through all the experiences of country practice on the frontier. He has been counsellor and friend to all. He has endured the hardships of ministering alike to the city resident and to the pioneer in the backwoods. His experiences in reaching his patients in remote sections, especially in winter-time, would fill a good-sized book. No call of distress ever fell unheeded

on his ears. No consideration of personal interest or comfort has he permitted to hold him back from his duty to his patients, which he held to be first and the financial consideration secondary, in his professional work. It is a pleasure here to record my acknowledgement of his faithful friendship during the long period of my association with him.

Then there were Dr. Henry Hannum, of Bayfield, and Dr. W. P. Sperry, of Phillips, typical "doctors of the old school" whom Ian McLaren so aptly described. There are a few like them in the younger generation. I regret to leave the list,—to which I might add indefinitely,—but will now dwell at some length on the history and character of the first pioneer doctor in this region, Dr. Edwin Ellis.

Dr. Ellis was a fine type of manhood. Long years on the frontier had given him many of the hardier qualities of the pioneer, yet they did not dim the finer sensibilities of his nature. I became very fond of him, and took pleasure in keeping him in contact with his profession in his declining years, obtaining for him the courtesies that were his due. On the fiftieth anniversary of his graduation, a banquet was tendered him by the profession of Ashland and surrounding towns, at which he was presented with a gold medal as a token of the esteem of his colleagues. It was noteworthy that he was graduated in 1846, the year that ether and chloroform anæsthesia were discovered. The advances in medical science during his lifetime formed the theme of this memorable occasion. He was called the father of the Ashland school system, and until the infirmities of age came upon him, the schools were his first thought.

He was an active Mason and was energetic in the or-

ganization of the various Masonic bodies in Ashland. His dignified manner and his command of the English language made him an outstanding figure in all Masonic and public ceremonies. A ready speaker, he could make a pleasing address on any occasion. No finer tribute could be paid to the memory of any man than was accorded to him by his longtime friend and business associate, Thomas Bardon; and it is here copied in full from the *Ashland Daily Press* of May, 1903, and is part of an entire page devoted to the memory of this grand old man, who had died the day before:

Dr. Edwin Ellis was born in Peru, Maine, May 24, 1824. He graduated from Bowdoin College, Maine, in 1844, and from the University of the City of New York in 1846, as a doctor of medicine. He was married in Maine to his first wife, the mother of Mrs. Augusta Kennedy, of this city. His first wife died in early married life and he was again married in Maine, to his second wife, Martha Baker Ellis, sister of Judge D. A. Baker, who was the mother of Mrs. Geo. C. Loranger, Ed. and J. S. Ellis, all of this city. Mrs. Ellis died but a few years ago at her home in Ashland. The doctor practiced medicine in Farmington and Oldtown, Maine, until 1854, when he removed to St. Paul and lived on a farm, the ground which is now known as Merriam Park, a suburb of St. Paul. He became associated with a syndicate of St. Paul gentlemen, compromising Hon. D. A. J. Baker, Hon. R. R. Nelson, Hon. Wescott Wilkin, Hon. Chas. D. Willes and other leading democratic Minnesotians of ante-bellum days. This organization was for the purpose of laying out townsites in the then territory of Minnesota and State of Wisconsin.

The doctor came as the representative of this body of his political and business associates to La Pointe and Chequamegan bay in the winter of 1855-56. He came overland from St. Paul, via St. Croix Falls and the Lake Superior trail to Superior City, then snow-shoed it along the south shore of Lake Superior to Bark Bay and across to the mouth of Sioux river and thence over to La Pointe. The writer has heard him say that the first night he

reached La Pointe, Antoine Gordon's father died. The town of Gordon, near Superior, is named after Antoine Gordon, who lives there yet, in his 85th year. Mr. Gordon lived here in early days, near the big ice-house in the west end. When Dr. Ellis reached his future home here, he was but 32 years of age. He immediately set to work and had entered from the government by preemption, this being before the homestead law was passed, the lands now embraced in what was then known as Bayport, afterwards known as Bay City, and later changed to the Ellis division of Ashland. The plat or map was recorded as "Bay City" and the lots were divided up between the old proprietors and promoters. The doctor moved his family here shortly after his first advent, and his old one-story log cabin mansion, where he lived a number of years, stood on the bay shore, east of "Bay City Creek" near where the Ashland Water Company plant is now located. There was another settlement further west on the bay shore, known as Ashland, platted by Martin Beaser, Geo. Kilbourn and Asaph Whittlesey, all of whom lived here. The postoffice, store and residence of Martin Beaser, was in the building, corner of Beaser Avenue (then Main Street) and Front Street. The Whittlesey's lived on Front Street, corner of what is now Tenth Avenue West, and owned by the writer. The large elm trees still stand there to mark the spot. Bernard Hoppenyan, Eugene F. Prince, Duncan Sinclair, "Jack" Barkley, Adam and Conrad Goeltz, Martin Roehm, Andrew Scobie, William and Peter Goetzenberger and a few others comprised the entire population of the two settlements, Ashland and Bay City.

The panic of 1857 almost depopulated the settlements, then, the great Civil War breaking out, about all the remaining ones left; so that the sole survivor was Martin Roehm and family, who occupied the Beaser house and was found by the writer there when he first came here with a surveying party in 1867.

In 1861, after the war had broken out, Dr. Ellis removed to Odanah, where he taught the Indian school for four years, and became the friend of the late Rev. Wheeler, who was stationed there as the representative of the Presbyterian board of missions. This was a life long friendship between the two families, the Wheelers and Ellis. The boys of these two families were born

in the wilderness, hunted, fished, and trapped together. The doctor then removed his family to Ontonagan, Mich., having received an appointment as doctor for one of the copper mines, near that place. He ran a drug store and was in general practice there, all the time keeping his interests together in Ashland—making snow-shoe trips in winter here from there until the spring of 1872, when he returned to participate at the new birth of Ashland, removing his family here in August, 1873.

During the preemption period, in 1856, it became necessary for the doctor to see the surveyor-general for this district, who lived at Davenport, Iowa, and the journey was made overland to St. Paul and thence by boat down the Mississippi River to Davenport.

The local land office at that time was at Willow River, now known as Hudson, Wis., later on moved to Superior, thence to Bayfield, and finally here, where it now is.

A narrative of Dr. Ellis is a history of Ashland. The old Portage and Lake Superior Railroad survey was first made here. Then came the Wisconsin Central Railway Company. They built from Penokee range to Ashland in 1872 and north from Stevens Point to what was known as Worcester or "101," a point the other side of Phillips. The panic of 1873 stopped all work, and the road was not completed here until 1877.

To Dr. Ellis, more than to any other man, now living or dead, belongs the credit of securing the Wisconsin Central Railway for Ashland. He gave liberally,—aye, beyond his proportion,—for this, then, to us, great enterprise. Depot grounds, dock frontage, right of way, hotel grounds, all contributed to with a lavish hand by our departed friend. The records of Ashland County teem with transfers from Edwin Ellis to these and kindred enterprises. Today the property donated by him is worth thousands and thousands of dollars. The "Lake Shore" now the Northwestern Railroad, were munificently remembered by him. Their two ore docks stand upon ground he once owned. School sites, industrial locations, bonuses in money for same, contributions for churches, etc., all came from his generous hands. The name of Edwin Ellis will long live in the written record, in the minds and hearts of a grateful public. His deeds of charity were manifold, given without the blast of trumpet or for notoriety, as many a poor person can testify today, though the dead heareth it not.

As president of the school board since the birth of our city, he did noble, unselfish work. Priceless the treasure of his labors. Beyond computation were his good works. His loyal, intelligent and able supervision of our educational interests, place Ashland in the front ranks in Wisconsin. The school-house was his workshop, his pride, his hope and his ambition to live. The face of no public man will be missed as his will be by our school population. No more will his brisk step and cheery voice be heard in the schoolroom, but his face will long live in the memory of child and parent and be blessed for ages to come. The public and parochial schools should all close tomorrow to pay their last tribute of respect to the grand old man who is now gone from our midst forever and sleeps tranquilly in death, to wake up in Heaven and receive his merited reward from an Almighty God.

The outpouring attendance on the morrow at the bier of their benefactor and friend will be immense I am sure, and as the tear-bedimmed eye gazes upon the saintly face of their grand old guardian for almost a third of a century, I am sure that a like scene will never be witnessed again in Ashland. Let them follow in the ranks of the great concourse to his grave, that windowless "palace of rest" wherein he will slumber in peaceful solitude until called to receive his just reward in Heaven.

The hospital patients, in days gone by, when the doctor was in active practice, remember his kindly face. He administered to the sick without price. He never refused a call, be it day or night, sunshine or storm. Surely this benevolent and learned man, skilled as a surgeon, unsurpassed as a physician, and incomparable as a citizen passes away leaving a record behind him to be envied by all.

He was liberal-minded. All creeds were Godlike to him. He loved his Maker, he loved his neighbor. Hatred of nationality or creed never rankled nor was harbored in his breast. He was too big, too brainy and too good for such an unchristian feeling.

Let the citizens of Ashland take steps to erect a monument in memory of the father of Ashland. Let the response for such a move be spontaneous, raise this enduring shaft or emblem of his noble worth upon the court-house grounds or on Ellis Avenue where present and future generations may gaze upon it in remem-

brance of our departed friend, for his like we shall never behold again.

—THOMAS BARDON.

"Blessed are the pure in heart, for they shall see God," said the Great Master. Purity of heart was the grand characteristic of the "Great Beyond." While without, he was careless in dress and personal appearance, within he was as clean of heart as a little child.

During the thirty years it has been my privilege to know and be intimately associated with him, I never heard him utter an unclean word. And withal he was a strong and vigorous man both physically and mentally, a student and a worker.

For years he was a judge, doctor, merchant and general business man. At the same time he took part in all public affairs, in everything that helped to build up and advance the interests of the city of Ashland. We all know what time, thought and labor he gave to our public schools. His was the leading spirit of the organization of the Masonic lodge, and for years he was at the head and front of that order in this city, and its present strength and prosperity is largely due to the foundation which he laid. He was a deeply religious man, not forcing his views upon others "in season and out of season," but by his manner of life and conversation, showing that he had a firm and abiding belief in a Supreme Being and in immortality. For years he has been a prominent member and elder in the First Presbyterian Church of Ashland.

He was without doubt the readiest and most pleasing extempore speaker we have ever had. Warm of heart, finely cultured and well-read, his eloquent voice was heard and welcomed upon almost every public occasion. To those who have known and admired his warm and vigorous intellect, it has been a sad sight to see the "windows of his soul" darkened during the last year of his life, but the loss of wife and the breaking up of home were too much for the grand old man whose home was more than his castle.

"Why weep ye then for him who, having won
The bound of man's appointed year, at last,
Life's blessings all enjoyed, life's labors done.
Serenely to his final rest has passed;

Banquet in Honor of Dr. Ellis, 1896

Facing page 161

While the soft memory of his virtues yet
Lingers, like twilight hues, when the bright sun is set."

—W. M. Tompkins.

I have thus quoted at length from these tributes, because such a life is an inspiration to young and old, and it is an honor to the profession that I am here representing to have had such a man in its ranks. He was a great man, whose qualities were not dimmed by the confines of a small and remote community.

XIX

The American College of Surgeons

In order to advance the standards of surgery, in keeping with the progress of the times, the leading surgeons of this country conceived the idea of forming an organization similar to the Royal College of Surgeons of England, and for this purpose a meeting was held in Washington, D. C., on May 5, 1913. It was attended by four hundred and fifty prominent surgeons of North America, all of whom were enthusiastic for the organization of the American College of Surgeons. The plans were rapidly consummated, and the college was incorporated by the State of Illinois on November 25, 1912.

The first convocation was held in the Gold Room of the Congress Hotel, Chicago, on November 13, 1913. I was one of this class, which numbered 1,059.

The college has grown steadily in numbers during the fifteen years of its existence, and, as evidence of its growth, has been of great service in raising and maintaining the standards of surgery and of hospital service. The first record of the college was a book of 187 pages. The volume of 1928 has 836 pages. During the fifteen years, 9,754 fellowships have been conferred.

While the college has done much to elevate the practice of surgery to the plane where it belongs, it has also caused many practitioners to do their own surgery, with the result that much poor surgery is still being practiced.

Modern training has done much to make surgeons of

general practitioners, since the curriculum and training of doctors nowadays gives to the graduate all the rights and privileges of surgery as well as medicine, and the doctor may practice as he pleases, be it internal medicine or operative surgery. Great increase in the number of hospitals is a large contributing factor, for the facilities they offer to the doctor stimulates the ambitious surgeon to undertake almost anything in surgery. Comment on the ethical principles involved will be found in a subsequent chapter.

The ethical ideals of the American College of Surgeons, to which each candidate is required to subscribe, are expressed in the fellowship pledge, which is as follows:

Recognizing that the American College of Surgeons seeks to develop, exemplify, and enforce the highest traditions of our calling, I hereby pledge myself, as a condition of fellowship in the College, to live in strict accordance with all its principles, declarations, and regulations. In particular, I pledge myself to pursue the practice of surgery with thorough self-restraint and to place the welfare of my patients above all else; to advance constantly in knowledge by the study of surgical literature, the instruction of eminent teachers, interchange of opinion among associates, and attendance on the important societies and clinics; to regard scrupulously the interests of my professional brothers and seek their counsel when in doubt of my own judgment; to render willing help to my colleagues and to give freely my services to the needy. Moreover, I pledge myself, so far as I am able, to avoid the sins of selfishness; to shun unwarranted publicity, dishonest money-seeking and commercialism as disgraceful to our profession; to refuse utterly all money trades with consultants, practitioners or others; to teach the patient his financial duty to the physician and to expect the practitioner to obtain his compensation directly from the patient; to make my fees commensurate directly from the patient; to make my fees commensurate with the service rendered and with

the patient's rights; and to avoid discrediting my associates by taking unwarranted compensation. Finally, I pledge myself to coöperate in advancing and extending, by every lawful means within my power, the influence of the American College of Surgeons.

PART TWO

Introduction

One who has lived through the last third of the Nineteenth Century and the first quarter of the Twentieth could not help observing many things that had to do with human progress.

He who has studied and practiced the healing art during that period, and has kept step with the relations of science with that art, has received many impressions that have led to conclusions of value,—not only has he made a pathway through the wilderness for his own feet, but has helped to clear the way for others, so that, by combined effort, a permanent highway has been established for all. Thus medical science has progressed. Much undergrowth of ignorance and superstition had to be cleared away. Obstructions of cults and quackery had to be cast aside; coöperation and united effort must be had among the workmen. Cause and effect must appear on the balance sheet. Only the best material must go into the structure. Its surface must be such that all may transverse it.

Such is the highway that medical science has established for itself, and it leads out into the unknown future toward the goal it has set for itself: to combat the agencies of disease, to relieve suffering, and to prolong life.

As a humble participant in these activities, I have had some experiences, made some observations, and reached some conclusions that may be helpful to others, either co-workers or observers, and to that end they are included in this narrative. Some of the papers I have

written from time to time are here reproduced. They are written in language that may be easily understood by the lay reader. The first is a paper on bacteriology (1897) and its relation to immunity to disease, giving a glimpse of this important science that has taught us the cause and underlying principles of the acute diseases. My purpose in setting dates to several of the different papers contained in this second part of my autobiography is to show what, at the time the specific article was written, was the trend of medical thought on the subject under discussion. Scientifically, I believe that these papers are abreast of knowledge in the treatment of disease at the periods herein indicated; and I hope that students of medical progress will find in what I have written more than a passing interest.

I

Bacteriology

(1897)

The science of biology, which treats of the forms and functions of living beings, has, through the agency of the microscope aided by the chemical and physical methods of the laboratory, given us a new department of science, which we call bacteriology.

This science treats of the lowest forms of organisms that are capable of manifesting life, living beings too small to be seen by the unaided eye, and many of them visible only when properly stained and placed under the most powerful microscope.

Scientists of all times have studied the manifestations of life and have sought the vital principle. Their studies, experiments, and researches have resulted in a high state of knowledge regarding the forms and conditions under which life exists; but a satisfactory definition of life is still impossible.

Not yet has man learned what is that inherent power of the seed to germinate and grow and produce a plant, or in the ovum to develop into an animal such as the human body, which develops from a single cell only 1/120 of an inch in diameter into that most wonderfully constructed, highly organized being whose powers are almost unlimited.

This power, permeates all nature and, showing at all

times and in all places the results of its work, still holds its secret securely in the realm of the metaphysical. The ancients thought that could they discover what life is, that they could have the key to perpetual existence and, by its proper control, they could live forever. We now believe that it was not the design of the Creator that any organic being should have perpetual existence, but that after a more or less definite period the vital principle must be returned to Him who gave it, and the tenement in which it existed must suffer dissolution, and the elements of which it is composed return to nature.

Hippocrates, the father of medical science, who lived four hundred years before Christ, was apparently the first to suggest the existence of a principle that attends the manifestations of life and exercises a control of its various functions with a peculiar intelligence. Aristotle, a little later, called this animating principle the *soul.*

The chemical philosopher claimed to account for the vital principle by chemical laws, and the mathematician attributed it to gravity and mechanical impulse: while the physiologist had still another solution of the problem. While modern science has demonstrated the fallacy of all these theories, we are still as far from a satisfactory definition of life as were these scientists of old. The scientist can produce in the laboratory almost any substance, but no one is able to endow that substance with life.

It has been noticed in all ages that all organic substances decay, that dead animal substances undergo a change which is called putrefaction, and that vegetable substances no longer capable of life undergo a similar change called fermentation. By these processes the purpose of nature is served, and these organic substances

are returned to the original elements of which they are composed, ready for use again in Nature's laboratory, where nothing is lost, but where every single atom that is once used is claimed again for use in a similar form, or some other.

Science has demonstrated that this apparent death and decay are really a manifestation of life in another form, and that these changes are due to the presence of bacteria which, though they may be present, cannot grow and flourish in the living organism.

There are, however, forms of bacteria which, under certain conditions, do flourish in the living organism and produce disease, as we shall see later on. The bacteria, then, may be regarded as the cause of the decay of non-living substances and of diseased conditions in the living organism.

Let us look back at the progress of the study of this subject during the past century, which claims all knowledge of this science as well as the vast number of discoveries and inventions in other departments of science. About the beginning of this century Appert published a monograph on the art of preserving animal and vegetable substances, which consisted of placing them in closely-corked or stoppered bottles and subjecting them to the temperature of boiling water (our present method of canning). A chemist of that time noticed that as soon as these vessels were opened and their contents exposed to the air, they began to ferment, or putrefy, and he attributed this to oxygen.

Some thirty years later, Schwan, by the use of the microscope, then reasonably developed, discovered in fermenting substances very minute globular bodies, which

had the power of reproduction and were present in juices or fluids undergoing alcoholic fermentation.

This that he saw was the yeast plant, and his finding can be said to have been the first discovery of bacteria. Schwan also discovered that if, in bottles sealed by the method of Appert, he allowed air, which had been previously heated, to come in contact with the contents, no change resulted; from which it was evident that something besides the gaseous elements of the air caused fermentation. Other scientists contested this theory and sought to explain fermentation by gaseous influences.

These controversies continued until 1854, when Schroeder and Von Dusch, in investigating the question whether fermentation of boiled fluids would take place if filtered air were admitted, found that air filtered through cotton or wool was deprived of the agencies that produce fermentation.

Then came Pasteur, of whom you all have heard. He confirmed the theories of his predecessors and found that it was not necessary to filter the air of its contained particles but that if left until they settle by gravity the air might be brought into contact with putrescible substances without causing putrefaction. He demonstrated this by drawing out the neck of the flask containing the substance and turning it downward. In which case the air particles could not find their way upward through the tube, as there were no air currents to carry them up, and they were prevented by gravity from rising.

In 1870 Tyndall, in a lecture upon haze and dust, publicly demonstrated the presence of countless minute particles in the air, and showed that these were the agents producing undesirable changes in organic substances. Pasteur, Tyndall, and Lister,—the father of antisepsis,—

demonstrated beyond all question that these particles in the air are the cause of these changes, and that heat as well as filtration is necessary to render them incapable of producing harm, and that the gases of the atmosphere are of secondary importance, if they have anything at all to do with it.

It thus became an established fact that fermentation and putrefaction are due to the presence of minute particles that are present in almost all substances, and that by heat or filtration it is possible to remove them or destroy their activity.

Pasteur further showed that the generally-accepted theory that the temperature of boiling water destroyed all living organisms was a mistaken one, since it was found that germs afterward grew in the liquid so boiled, even though there had been no subsequent contact of outside air. He found, however,—and his results have been corroborated by many investigators since,—that by boiling under pressure, so as to secure a temperature of 236 degrees Fahrenheit, and subsequently excluding the air, that the fluid remained sterile.

The part of the germ that is able to resist the boiling temperature is called the spore, or the germinal part of the cell that is capable of resisting this temperature and develops into an individual germ when the temperature again becomes favorable to its growth. It has been found that boiling on three successive days destroys all tendency to further germ growth. Until this theory became elaborated, there existed a belief that life could be spontaneously generated, and the many fallacies of the foregoing experiments were adduced as argument in its favor.

It is now admitted by all scientists that spontaneous

generation is impossible; that the capacity for life is an obtained inheritance from a parent, and this brings us that universal law of nature: that nothing can be created and nothing destroyed; that life had its source with the Creator in the beginning, and has been transmitted from parent to offspring ever since. It was from these fundamental principles that bacteriology developed into a distinct branch of science.

By methods of culture and staining and study with the microscope many forms of bacteria have been discovered and the casual relation of some of them to disease has been demonstrated.

The past half of the century was marked by great advancement in this science. It led to the antiseptic methods of surgery, which almost revolutionized the practice of surgery, making it possible to do operations with slight danger that were before attended with grave consequences in a large percentage of cases.

The presence of pus in an operative wound is now considered as evidence of bad surgery, while it was formerly considered necessary to the healing process. Before the days of antisepsis, surgeons spoke of laudable pus, but now we regard it as the opposite of laudable. Pus represents the carnage wrought by the battle between the animal tissues and the pus germs, and the abscess, or pus, represents the carnage of the battlefield.

Bacteriology has also demonstrated that many diseases are due to germs and that the heredity of disease is more apparent than real, it being the susceptibility to the disease that is inherited.

In 1863 Davaine demonstrated that the anthrax bacillus was the cause of anthrax, which was destructive to cattle.

Pasteur soon after, by several years' work, found the cause of a parasitic disease then affecting the silkworm, and threatened to destroy the silk industry of France, to be a specific germ, which he succeeded in successfully combating, thus saving the endangered industry. In 1873 Obermeier announced the discovery of the germ in the blood that caused relapsing fever. Koch published a work on infectious diseases and the part played by bacteria in their causation.

In 1879 Hanson discovered the bacillus of leprosy. Eberth and Koch discovered the bacillus of typhoid fever in 1880. In the same year Pasteur published his work on fowl cholera, and Sternberg discovered the germ of pneumonia. In 1882 Koch discovered the bacillus of tuberculosis, and in the same year Pasteur published his researches on a disease of swine known in France as *rouget,* and gave to the world his first work on the subject of rabies or hydrophobia. The bacillus of glanders was also discovered in 1882.

In 1884 Koch announced the discovery of the comma bacillus of cholera; and Loffler, the discovery of bacillus of diphtheria. In the same year Rosenbach published a work on the germ producing pus. During the same year the bacillus of tetanus was discovered by Nicolaier, and then followed a period of eight years, during which time no important disease germs were discovered. The literature on the subject was, up to 1892, chiefly in the French and the German languages; in fact, it was in France and in Germany that nearly all biological researches had been made, with the exception of the work Tyndall and Huxley, in England, and Lister, in Scotland. I have cited but a few of the discoveries in this field during this most interesting period.

During the year 1892 Sternberg, who is now (1895) Surgeon-General of the United States Army, published in English a large volume of 900 pages on the subject of bacteriology; and since that time the literature of the subject has been added to extensively in all countries, and many other disease germs have been differentiated. With this brief history of the subject, let us pass on to consider the bacteria individually.

We must remember that the basis of all organic life is the cell; that all organic beings are either simple, consisting of but one cell, or compound, composed of many cells. The human body, the most highly organized organism in nature, begins in a single cell only 1/120 of an inch in diameter, and becomes a mass of cells of such infinite number that we might as well try to count the grains of sand on the seashore. The cell is a mass of protoplasm, extremely minute in size, containing a germinal spot called the nucleus, the whole contained in a cell membrane and endowed with essentials of life.

Protoplasm is a viscid, gelatinous, transparent, semi-solid substance, and was called by Huxley *the physical basis of life*. The essentials of life are birth, growth and development, decline and death. Since it is demonstrated that the capacity for life is obtained only by inheritance, the term *birth* implies a separation from the parent with more or less power of independent existence. Growth and development apply to the processes by which the cell reaches its maturity. Since it is a universal law that all organic beings must have a limited existence, there follows after maturity a period of decline, ending in death. Such is the cycle of life in the cell as well as in higher organisms of which it is a unit; in the lowest form of bacteria, which develops into a mature being in a few

minutes, to the human body, which requires twenty years. Each individual bacterium is a cell corresponding to the definition that has just been given, and hereafter we shall use the terms bacteria, cells, and germs synonomously.

The bacteria vary in size according to the species to which they belong. The average is perhaps a micromillimeter in diameter, which is a twenty-five-thousandth of an inch. A little computing here is necessary to enable us to realize the infinite minuteness of these cells. It would require 25,000 of them laid side by side to reach the distance of an inch, and a sphere 1/25 of an inch in diameter, which is about the size of a mustard seed, would require 1,000 cells to reach across it, and the sphere would contain in its volume 523,600,000, a number which is incomprehensible to us, and bewilderingly so when we remember that there are bacteria only one-tenth as large.

The red corpuscle of the human blood, which is 1/3200 of an inch in diameter and is the smallest cell in the human body, might contain many disease-producing germs. The forms of bacteria are very simple, and have been compared to balls, leadpencils, and corkscrews. They are spheres, rods, and spirals. The spheres are called the *cocci*. They are not always spherical, but may, when lying close together, be flattened on the sides that come in contact one with the other. The rods are the *bacilla,* the length of which is from two to ten times the thickness, and have either square or round ends. These may be either straight or curved. The third form, or the *spirilla,* as they are called, are long, slender filaments, bent in the shape of a corkscrew.

There are hundreds of different species of bacteria, but all will come under one or the other of these forms.

The manifestations of life in the bacteria is well illustrated in the seed. We know that a seed about which no signs of life can be seen, when placed in proper soil and under proper conditions, will grow and produce a plant in all respects like the plant which produced the seed, and that the offspring plant will in its turn produce many seeds capable of the same cycle of changes as the parent plant. In this way the species is preserved. This capacity for life exists with great tenacity, and seeds will often grow after lying in a dormant state for years. It is impossible as yet to fix definitely the length of time that seeds will retain their vitality, but in one instance it was found that seeds which had been dormant fifteen hundred years (in mummy cases), germinated, and brought into existence a new species of a plant. An account of this will be found in an interesting article on *The Latent Vitality of Seeds,* in the *Popular Science Monthly* of May 18, 1897, which all who are interested in the subject will do well to read.

This same article mentions experiments in which seeds were subjected to a temperature of 328 degrees below the freezing point for four days and still retained their vitality. Their ability to endure heat is not so great, as the boiling temperature is sufficient to destroy vitality in a very short time. The same is true of the bacteria, though not to such a degree as in the case of seeds. We know, however, that some disease germs may remain frozen all winter, and generate disease when thawed out in the spring, and that boiling cannot be relied upon to kill the spores of these germs.

It is also observed that each individual seed, when it

has completed its existence as a plant, has produced many seeds. In this way a bushel of grain is planted, and many bushels harvested. It seems to be Nature's purpose that enough seeds shall remain after a very large proportion are deprived of their power of germinating, to find their way into favorable soil and reproduce the species. You will all, no doubt, remember having stepped upon a puffball in the field and what a cloud of smoke arises from it. This is only a dried mushroom, and the smoke is composed of myriads of seeds, each capable of producing a plant like the parent; however, we know that few of these seeds will germinate, but that nearly all will perish, as they can only grow in a particular soil.

In this way the species is preserved. For instance, wheat, with perhaps slight modifications produced by cultivation, is the same plant today as when cultivated by the Egyptians four thousand years ago. The same is true of bacteria; they being everywhere present and in such countless numbers, that, while only a comparatively small number may find their way into favorable soil for their growth and development, a sufficient number will do so to preserve the species, so that mankind from generation to generation has the same diseases to contend with. Some diseases appear to subside and lie dormant for a variable time, only to break out again with renewed virulence, as, for example, Asiatic cholera and the plague. Contagious diseases do not exist with us all the time, for there are periods of apparent immunity from them. The germs are lying somewhere in a dormant state, and will spring into life at the first opportunity.

The bacteria are cells, and each cell is a mature being, capable of a life independent of all other cells around it.

In the higher forms of plant and animal life the cells become connected together in such a manner that each one is dependent, in a way, upon the other. In the bacteria the cells are the same in appearance and consistency in the individual of each species, with the exception of slight variations in size and shape, and remain so during life, while in plants and animals the cells, which are almost as primitive as the bacteria in the beginning, develop into specialized organs, the individual cells of which vary as widely during their life-history as do those of the different organs. By certain methods of staining there can be seen under the microscope within the cell a small round or oval body of variable size, which is called the nucleus. The nucleus is the germinal spot of the cell or the part in which the life first begins to manifest itself.

The growth of bacteria, like plants, requires certain conditions. These are: moisture, a proper temperature, and a medium that will supply suitable food. We know that some of the plants thrive best where it is cold, others where it is hot. Some in darkness; but most in the light. Some will grow best in the swamp; others on the high land. Some kinds of soil will produce certain kinds of grain; while other seeds will thrive very poorly there. Different species of bacteria will not thrive equally in the same medium, nor will the same species live long in the same medium. Just as the farmer who wishes to cultivate the same crop on a piece of land must enrich the soil each year with a fertilizer and thus supply the elements he takes from it; or, as they say, "the crop will run out."

Bacteria grow with variable rapidity. Those of septicemia or erysipelas will show their presence in characteristic symptoms in two or three days. Those of hydro-

phobia, while they usually develop in from four to eight weeks, may take years, as much as seven years having been noted between the bite of a rabid dog and the development of the disease. The germs of tuberculosis grow slowly as a rule, and the patients may have incipient consumption and not be aware of it, may live for years with the disease, and finally recover, while in others the body resistence is at so low an ebb that the disease advances rapidly,—what is called "galloping consumption."

We often notice that some people take every disease that comes along, while others are rarely affected. There is in all organic beings a principle that is antagonistic to the entrance of foreign cells into that organism. Sometimes that antagonism is so great that, though the germs may be present, there is no manifestation of their presence, because this principle is stronger than the germs. This is why two persons may be equally exposed to the contagious disease and only one takes it. Or, if both do take it, it may be fatal to one and only slightly affect the other. We have stated before that a species of germ cannot long survive in certain media. It is this, together with the principle of antagonism, which is called the *vis medicatrix naturæ,* which enables one to recover from a disease due to bacterial invasion. It is a question of which possesses the stronger vitality,—the germ, or the invaded body. The prime object, therefore, in treating a disease is to increase the resistance of the invaded body and to antagonize the action of the germs. On this same principle one attack of most contagious diseases confers immunity for a variable period of time, often for life. We cultivate this resistance to the disease smallpox by vaccination, and in other diseases, as diphtheria, by injecting into the infected body the blood

serum of an animal in which the antagonistic principle has been cultivated.

The method of reproduction in all bacteria is by division, or, as it is technically called, *fission*. Germs while in the non-growing or resting stage transmit life by the formation of spores. These are minute bodies that form within the cell, have a thick investing membrane, similar to the egg in higher organisms, and are capable of resisting heat and chemical action to a remarkable degree. The parent cell may be destroyed, but the spore under proper conditions will grow and produce a cell like the one that generated the spore.

That principle in life which makes the offspring like the parent and thus preserves distinct species is manifest in all forms of life, from the smallest and the most minute to the greatest and most complex. Many different species look alike; yet, when we cultivate them, we find a wide difference in characteristics. Another method of reproduction is by internal division, in which the nucleus only divides, the main part of the cell furnishing nutriment to the growing part. This is the form of growth in the egg, the growth beginning at the germinal spot and feeding upon the main mass of the egg. The rapidity of reproduction depends upon how favorable the conditions of growth may be. In some species complete division takes place in twenty minutes. Let us put it at a half-hour. At this rate one cell dividing into two and then into four and then into eight will, at the end of ten hours, produce 1,176,576. It has been calculated that one single bacteria could produce in three days 47,000,000,000 weighing 16,000,000 pounds.

It is not necessary, however, for the bacteria to increase with this rapidity, for by the time a few genera-

tions grow, they have themselves produced a substance that retards their growth, so that a whole colony will in a short time destroy itself if fresh nutriment is not furnished. They literally die of a poison produced by themselves.

The yeast plant when put into a mixture of starch and water will grow and multiply with great rapidity, producing alcohol, and setting free carbonic acid gas. You have all observed this in the raising of bread with yeast. This action continues until sufficient alcohol is produced to prevent further growth of the germ, and the action ceases. If the mixture is allowed to stand beyond this period, the formation of gas ceases, the dough falls, and your effort to make good bread is a failure. If more housewives understood this, there would be less dyspepsia and more good-tempered husbands in the world. The growth of germs in the human body is hindered not only by the antagonistic influence of the body, but by this same self-poisoning of the germs themselves. This substance, which is called ptomaine, varies in its nature with the different species of germs. The ptomaine is not only injurious to the germs producing it, but is also to the organism in which they are growing. The presence of disease germs in the body is not accompanied by symptoms of the disease until they have grown to such numbers as to produce a sufficient quantity of ptomaine to affect the body injuriously. We then have pain, fever, or other symptoms of disease. The ptomaine of one species of germs is more antagonistic to other germs than to the one that produced it, which is another factor in preserving the individuality of the species. Two diseases rarely exist in the human body at the same time. Each species of disease germs produces symptoms that, taken

collectively, enable us to call this group of symptoms a particular disease. Occasionally a new disease comes to our notice, but it is probably a modification of some disease that existed before; just as a new variety of fruit or vegetable is produced by methods of cultivation of pre-existing plants.

The characteristics of bacteria are studied by cultivation. A suitable soil must first be prepared. For this purpose we take a mixture of gelatine, extract of beef, meat peptone, and the addition of certain salts. This is made acid, alkaline, or neutral as may be required, is then clarified, filtered and sterilized by boiling, after which is poured into dishes, or test-tubes, which have also been carefully sterilized. The dishes are covered and the test-tubes are stoppered with non-absorbent cotton, and this permits the air to enter but excludes the germs. Having found, on trial, that each dish, or tube, contains no germs, also that germs will grow in the kind of soil provided, we proceed to inoculate the prepared soil with the kind of germs we desire to cultivate, or study. This must be performed with proper care to exclude air germs, and so forth. We next place the inoculated tube in a chamber called an incubator or a culture chamber, where a uniform and proper temperature is maintained for three or more days. If our experiment is successful, we shall then find that germs thus introduced into favorable soil will grow and produce characteristic colonies that are visible to the naked eye. Under these same methods germs can be counted, isolated, and studied. By the presence or the absence of germs, the germ-destroying power of antiseptics and sterilization can be tested and proved.

Bacteria exists almost everywhere on the surface of

the earth. No other plants or animals are so universally found in nature.

Three of the important media for the distribution of bacteria may be stated: air, soil, and water. The air is not a natural home for bacteria, but has a measure of warmth and organic matter; thus, bacteria may retain life in the atmosphere. The air, especially when in circulation, is a great medium for their distribution. Dust that arises from the street is laden with the dried and pulverized sputa of persons afflicted with infectious diseases, or made up of offal from animals; thus a multitude of bacteria are disseminated through the air. Sweepings from stores, stables, and the like, when scattered through the air, provide fertile soil for bacterial life. Warerooms where rags and skins are handled spread anthrax and cholera germs. The winds and currents of the air carry these fine particles and scatter becterial life all over the land.

In a room where people have been moving, which has been swept, or where clothing has been brushed, close the blinds or draw the curtains, allowing a ray of sunshine to pass through a small opening. Across the path traveled by this ray of light millions upon millions of small particles of dust may be seen in motion.

It is apparent that bacteria may be readily and constantly taken up, to float in the air, and are thus distributed over great areas, just as we have seen in the case of the mushroom.

Sternberg's *Manual of Bacteriology* gives a list of nearly forty species of bacteria found to be present in the air, among them several species that are associated with wound infection.

No surgeon would be justified in operating in a room

the air of which contains dust and dirt, nor in a room that has just been swept. Water is a natural home for bacteria, the number and kind present depending upon the source from which the water is obtained. Water of exceptional purity is often apparently free from germ life, and it may be difficult to see them with the microscope, but the plate-method will tell. The water from the ocean, river, and streams will invariably be found to contain germs. Water from stagnant pools or sluggish streams, or water in which sewage flows, may contain millions in each cubic centimeter. In Sternberg's *Manual of Bacteriology* one hundred and twenty-two species of bacteria are noted as being found in water, among them being twenty-nine species that are disease-producing, including three species that produce pus in wounds. The same authority enumerates fourteen species of the bacteria that have been found on the surface of the human body in normal health; eight of which species were disease-producing, and of the latter, three were pus-producing. This authority enumerates fifteen species in the nasal secretions (eight disease-producing); from the secretions of the mouth, seventy-two species (twenty disease producing), all of persons in ordinary health. In diseased conditions,—catarrh, cold, and similar diseases, —particularly in persons of uncleanly habits, these members would be many times multiplied in kind and number and with great rapidity. These germs being present in such large numbers, it is evident that the dust that flies about may carry any number of germs, which are deposited in favorable places for growth. They fall upon articles of food, which we see spread out so temptingly in front of the stores. They are breathed into the lungs,

or are lodged in the throat and swallowed with food or drink.

The housefly is a pest we all heartily despise, and justly so, for it disseminates disease germs in a way that would surprise us if we knew its full extent. The mosquito disseminates malaria. The domestic animals, the dog and cat, carry from their familiar haunts many germs, and may spread disease and death. Milk is a potent medium for the carrying of germs, it being itself a good medium for their growth. Money, which has almost all the other evils of the world laid at its door, and especially paper money, becomes charged with filth and germs of many kinds in its circulation among the people, and spreads disease. Germs lodge in the clothing, and are carried great distances; they may be enclosed in letters, and give disease as well as news to the recipient. The water we drink contains bacteria; the uncooked food we eat contains them; yet we wonder when disease comes along how in the world we got it. We blame Providence, which seems to us an injustice when it is really the inevitable results of the operation of Nature's eternal laws. The stern law of "the survival of the fittest" is everywhere present.

In the soil there are many varieties; rich soil may contain as many as a million in a cubic centimeter, which is a gram, or about fifteen grains. Manfredi found in the dust of the street of Naples an average of 1,000,000,000 per C. C., there being about ten times as many in the quieter portions. Many disease-producing germs abound in the soil, notably the bacillus of tetanus or lockjaw. The prevalence of this germ in the soil gives rise to the popular idea that a rusty nail run into the foot often causes lockjaw. It does so because the nail has these germs

upon it, and not because it is rusty. The rust is not poisonous; but, by rendering the surface of the nail rough, it offers better lodgment for the germs than a smooth one would. A smooth nail would probably have the germ removed in passing through the clothing or through the outer layer of skin. If the wound is not infected by the nail, the patient usually infects it himself by applying raw salt pork, which cannot fail to be full of germs. We retard the growth of the germs by cold. If we wish perishable foods to keep, we put them in an icebox, where the presence of ice keeps the temperature too low for the growth of bacteria. By keeping organic substances frozen, there is no limit to the time they may be kept.

A few years ago some Arctic explorer found the body of a mammoth, which had became frozen in the ice and had existed there for ages and still remained in a perfect state of preservation, so that the dogs of the party fed on the frozen flesh of this creature of prehistoric ages. By cooking we destroy the germs; so that cooked foods will keep much longer in ordinary temperature than those that are uncooked. By cold we simply retard the growth, which will go on as the temperature again becomes favorable to growth. By chemical action germs may be destroyed; but chemicals that are destructive to germs are also injurious to the organism in which they are to be destroyed; hence the difficulty in eradicating disease germs from the body when it has become invaded. When germs of disease are present in the body, and have developed to sufficient numbers to cause symptoms, they are not accessible to local action of drugs, because they have migrated into the tissues and only a comparative few are accessible. Therefore, to treat a germ disease we must

destroy as many as possible and depend on the resistance of the system to do the rest. The latter must, however, be reinforced as much as possible by appropriate treatment.

In our surgical operations we aim to get the room as free as possible from dust; but as it is impossible to do this absolutely in a room where people are moving about, we must depend upon preventing germs entering the wound, by absolute cleanliness of everything that is to come in contact with the wound, then destroying what may settle from the air by appropriate chemicals. This is what is called *antiseptic surgery;* and it enables us to secure the healing of wounds without inflamation or the formation of pus, which, before the days of antisepsis, was considered an essential to the healing process. Now, however, pus in an operative wound, where it did not exist before the operation, is generally considered as evidence of bad surgery.

Now, from what we have seen, it is evident that bacteria are swarming in countless numbers all about us. Many varieties cause disease under certain conditions, while the greater number of them are not injurious to us, but are, no doubt, helpful in many ways. It is true that we wage a continual warfare with the disease germs; and, since many of them are present in our bodies at some time or other without causing trouble, it is evident that they do not find a favorable soil, or else the resistance of the body is too great for them to overcome. The most virulent germs are those of contagious diseases. We are able to control them, and sometimes stamp out epidemics, but there are other germs less virulent but more prevalent,—more insidious in their invasion,—which need close watching. One of which I wish to speak in

particular, is the tubercle bacillus, which causes one-seventh of all deaths. This is the germ of consumption; and since becteriology has taught us so much about this germ, the means of combating it are absorbing the attention of every philanthropic mind today. This disease is not inherited,—a fact that I as well as many of you can take comfort in. It is the tendency of the disease that is hereditary; that is to say, the weakened resistance is transmitted from parent to offspring. No one can take tuberculosis unless the germ is introduced into the body. The fact that consumption frequently runs through a whole family can be explained by the members living in an atmosphere full of germs. Houses in which such cases occur will generally be found to be carpeted and full of hanging fabrics, cushions, and bric-a-brac of many kinds, which afford a lodging-place for the germs. Yet some people blame it to Providence.

Enough has been said to suggest to the thoughtful the cause and prevention of acute disease and, in a measure, its treatment. These thoughts admonish us that there is a continual warfare being waged in nature; and though man is its favorite, and all other creatures are his to govern, yet there are times when he himself succumbs to the lowest forms of organic life.

The foregoing article, written in 1897, demonstrates the trend of scientific thought thirty years ago. The fundamentals of bacteriology have not changed since that time, but some refinements have been worked out. Some new discoveries have been made and some specific sera and vaccines have been developed. As applied to surgery, refinements of technique have been worked out, but the underlying principles have not been changed, which is a wonderful tribute to the early discoveries and inves-

tigators, to the thoroughness of their work, and to the correctness of their deductions.

We have seen typhoid and yellow fever practically wiped out; diphtheria divested of its terrors; syphilis added to the list of the curable diseases, while puerperal fever is seldom seen now, and septic conditions generally are less prevalent. All this control of disease has come through bacterial investigations. Continued investigation bids fair to bring under control other enemies of mankind, such as scarlet fever, pneumonia and meningitis.

II

Peritonitis

(1908)

In order properly to comprehend the different phases of peritonitis, it will be well to review the anatomy of the membrane affected.

The peritoneum is by far the most extensive serous membrane of the body; greater in extent than all the others combined, and in area almost equals the skin covering the body. It lines the abdominal cavity and covers all its contained organs and their supports, being one continuous membrane throughout. It is one large sac, with a constriction under the liver at the foramen of Winslow, forming the greater and lesser omentum. Its numerous folds and plications make it of a peculiar shape, difficult to form into a mental picture, or to describe. With the organs enfolded in its embrace, it fills the abdomen,—a space of irregular outline, but which can be roughly estimated as some 18 inches long, 12 inches wide, and from 2 to 6 inches deep. We speak of the peritoneal cavity, which is a misnomer, as in reality there is no cavity in the unopened abdomen, but visceral lies in contact with visceral or parietal peritoneum throughout.

In the male it may in reality be said to be a closed sac, but in the female there is communication with the genital tract and the outside world through the fallopian tube.

The free surface of the peritoneum is smooth and

shiny; of a purplish color, varying somewhat with the organ it covers, and its under surface, except that in contact with the liver and diaphram, loosely attached to the subperitoneal cellular connective tissue, from which it receives its blood supply, and wherein are distributed its abundant supply of lymphatics, whose terminals dip into the intercellular spaces on the endothelial surface.

The surface of the peritoneum is kept moist by a natural secretion, which also acts as a lubricant; so that there may be no friction of the surfaces, which are more or less constantly moving on each other. In health, this fluid does not accumulate; and when, on opening the peritoneal cavity, we find free fluid, we know there is some diseased condition.

These smooth surfaces more or less constantly move on one another with impunity and without complaint until attacked by foreign matter or pathogenic organisms, when the site of such invasion becomes the seat of excruciating pain, with shock and general constitutional disturbances; or, by special provision of Nature, fluid may be thrown out, the opposed surfaces separated by peritoneal effusion; thus friction is prevented and the symptoms are of a milder character.

The looseness of the parietal peritoneum is misleading at times, as the operator is liable to think he is through it when the finger slips around under the wound edges, meeting little resistance.

So loose is this attachment, that pus, when once through the peritoneum, readily burrows, and it may point a considerable distance from its starting place, as, for instance: an appendiceal abscess may point on the opposite side of the body, and it may be that many so-called cases of general septic peritonitis that recover

may be cases of extensive burrowing of pus outside the parietal peritoneum, the so-called ectoperitonitis. This membrane, from its loose structure, may become greatly thickened during some inflammatory conditions, and this property is possessed to somewhat greater extent by the parietal than the visceral peritoneum. However, it is a matter of common observation that the visceral peritoneum is found thickened; it strips off the intestine very easily during manipulations, and it is so soft and friable that it is very difficult to replace it when so detached.

The abdominal organs are formed in embryonic life behind the peritoneum, and in their development push forward, carrying with them bloodvessels, nerves, and lymphatics necessary to their function, between two layers of the peritoneum and the length of this peritoneal root corresponds to the freedom of motion required of the invested organ and the position it is to occupy, and receives its name by prefixing the term *meso* to the name of the organ in relation, as the *mesentery* of the small intestine, the *meso-colon* of the large intestine, the *mesosigmoid,* and so forth. Some organs formed behind the peritoneum remain there and are covered only on their front surface,—as the kidneys and the pancreas. The ascending and descending portions of the colon are not completely invested, leaving from ½ to 1 inch in width uncovered and in close contact with the posterior abdominal wall. The peritoneal investment of the stomach and transverse colon is peculiar in the arrangement of its folds and layers.

This delicate membrane, by virtue of its power of absorption, is able to take care of some infectious matter; but when its power of resistance is overwhelmed by sudden outpouring of pus, or bowel contents, it is exceedingly

liable to inflammation, and gives evidence at once of the infection by characteristic symptoms. Peritonitis may be said not to occur except as a result of infection. In males the sources of infection may be the appendix, or perforations of some of the hollow viscera, or may be secondary to some post peritoneal inflammation, such as perinephritic, or liver abscesses. A common cause, of course, lies in perforating wounds of the abdomen. In females we must add to the above list. A cause, more common than all the others, is infection from the genital tract, due to the open end of the fallopian tube. Tubercular inflammation may also occur from migration of the tubercle bacilli through the intestinal wall, or, as is no doubt the most common route, through the lymphatics.

As a result of perforations, more or less bowel contents escape into the abdominal cavity; and if small in amount and peristasis is limited, localized peritonitis may result and the area become walled off by adhesions. The situations where localized peritonitis is possible are those at the margins of the cavity,—above the gastro-colic omentum, outside the ascending or descending colon and the pelvis.

At the center of the abdomen any infectious material is so distributed by the peristaltic action of the bowel that localized peritonitis is hardly possible unless accompanied by immediate paresis of the intestine. This can be understood when we remember that the mesentery is 4 to 5 inches long, and this gives a wide range of movement to the coils of the intestine, while the ascending and descending portions of the colon are closely held to the back wall of the abdomen and do not change position with the peristaltic wave, as does the smaller intestine. In ascites, when the body is upright, the intestines, con-

taining at all times a varying amount of gas, float upward, so that it is possible to puncture the cavity without injuring the intestine. The position of the body determines the points to which peritoneal effusions gravitate; with the body flat on the back, there are *three* points: the lumbar fossæ and the pelvis. In this position the lumbar spine presents an eminence from which there is a sloping to the points mentioned. In general peritonitis, this point is to be borne in mind; and when it is desired to drain from the pelvis, the body should be elevated sufficiently to overcome this slant toward the lumbar fossæ. On account of the root of the mesentery, extending downward and to the left, an extravasation occurring anywhere to right of the median line is deflected into the right side.

The mesosignoid also takes the same direction, which accounts for our seldom, if ever, finding a collection of pus in the left side between the kidney and the pelvis.

When the onset is sudden, as in the perforative variety, there may be little or no effect as shown by the pulse or the temperature; but both, especially the former, rise when the inflammation becomes well established a few hours later. The pulse becomes rapid and wiry; respiration, thoracic; pain constant on deep breathing, or perisalsis. Immediately after perforation, the shock causes paresis of the bowel, with absence of peristalsis for a varying length of time. Tympanites may be due to gas in the intestine, or free gas in the peritoneal cavity,—a condition common in perforations of the intestine, but rare in appendicitis. It will be noticed in most cases where the appendix has sloughed off that the proximal end is closed.

Vomiting, a common symptom of septic peritonitis, be-

gins within a few hours; at first stomach contents, then bile, and later characteristic black vomit, which warns us that a fatal termination is to be expected. There is constipation at first, but there may be diarrhoea later. There is muscular rigidity, greatest over the point of primary lesion, and a tendency to flex the thighs on the abdomen.

The pain at the abdominal lesion is often deceptive as to location of the trouble, but muscular rigidity is a reliable symptom. Kelly has invented an instrument for measuring the resistance of the abdominal walls, and regards it as another instrument of diagnostic precision.

The symptoms of a well-developed peritonitis are so positive and so constant that little difficulty need be experienced in making a diagnosis; but in the early stage it is not always so easy to distinguish between ordinary colic, due to acute indigestion, and acute appendicitis; and it is at this time that we should know if effective treatment is to be applied, and that is operation. Other forms of acute peritonitis are more easily diagnosed. The importance of early operation in all acute infections of the peritoneum make it imperative that we be able to make the diagnosis early, and we should be able to say to our patient positively our opinion as to the course to be pursued and to back it up with good professional counsel; for it needs to be put strongly to the patient or friends that operation is necessary, since it is apt to come to them as a shock for which they are unprepared, and they are likely to say, just as the uncertain doctor will say, that if not better tomorrow we will consider the operation. Tomorrow is too late in acute septic peritonitis; and while the best thing we can do is to open and clean out the abdominal cavity, that seldom if ever does

any good, for the system is charged with toxins and the peritoneum infiltrated by the septic matter that is pouring through the lymph channels into the blood and prostrating the patient as no other form of inflammation can do.

When we consider the extent of the peritoneal surface, we can form some idea of the violence of the blood poison by imagining the skin of the body endowed with the same power of absorption as the peritoneum and the body immersed in a fluid of the same virulent septic power as that contained within the peritoneum in a case of acute septic peritonitis; and it would require no great stretch of imagination to appreciate the extent of infection that would occur.

About our only hope of treating successfully a case of septic peritonitis by waiting is that it may be localized,—walled off, as we say,—so that it may be opened and evacuated without general peritoneal infection.

The most satisfactory cases are those that have a localized focus that can be opened extraperitoneally,—as pelvic abscesses, which can be opened from the vagina; perinephritic or hepatic abscesses behind the peritoneum, or those cases of appendicitis where there is a cavity and adhesions so formed that it may be reached by following around outside the parietal peritoneum until the cavity is reached.

I wish here strongly to protest against irrigation in these cases, unless it be in the case of pelvic abscesses; for I am confident I have seen many cases of local peritonitis made generally by this means. I have seen the best results follow the method of making a full opening, —packing with one or two yards of gauze around the infected zone, then breaking open the abscess with a finger, wiping out the pus, and while the edges of the cavity are

held apart by fingers or retractors, filling it with peroxide of hydrogen, and wiping out as before. This may be repeated as often as seems necessary, and the cavity finally filled with absorbent gauze, which may be impregnated with iodoform, if so desired. Cases thus treated have all recovered, and I formerly lost them under irrigation treatment.

I admit the temptation to wash out the cavity is great; but it should not be done, unless we know the cavity is surrounded by a firm wall; and we do not know this; in fact, we have to open the parietal peritoneum to get at the septic focus, and we must under no circumstances risk forcing the septic matter on the healthy peritoneum by the irrigating fluid.

Where the whole peritoneum is infected and there is free fluid already throughout the abdomen, we are forced to irrigate. There is nothing else to do. We would do the same to any infected surface we might treat elsewhere.

My experience with the treatment of general septic peritonitis has been very unsatisfactory, and they have been many,—a very discouraging record. But when I read in Senn's book that he has never seen one recover, I do not blame myself so much, and am only moved to regret that our science has not yet given us an effective and successful method of treating this dreaded malady. The treatment of peritonitis is operative, and the successful treatment is early operation. The appendix is to blame for most of the cases,—a very large majority. There is a time in every case when operation can be successfully done: that time is as soon as the diagnosis can be made, which should be at the commencement of the attack, or within a few hours at most.

Physicians must learn to diagnose the diseased appendix and educate the people to having it removed, whenever it is making trouble. Interval operation for appendicitis is so safe that no one need dread it, and many lives will be spared. The physician should call the surgeon into consultation in every case of suspected peritonitis, from whatever cause, and together they should be able to say if operation is necessary, and when. Timely operations will reduce the number of those cases on which we may as well look with folded arms, so far as our ability to save the life of the patient is concerned.

III

Conservative Surgery of the Ovaries

(1909)

The tendency toward conservatism in surgery is growing with us of recent years, especially as regards organs of important function. This is probably as true of the ovaries as of any of the organs that have come under the surgeon's hand during the present surgical era.

During the past twenty-five years the ovaries have passed through all forms of treatment, from counter-irritations to total extirpation. Modern surgery has accepted as its purpose to repair rather than to remove, where it is possible to cause an organ to continue a desired or an essential function. Instead of removing the ovaries entire, as we formerly did, we now aim to leave a portion of the ovarian tissue, in order to avoid precipitating a stormy menopause, which is often a more distressing condition than the one for which the operation was done.

We attribute to the ovary an internal secretion, so-called, and regard it as essential to the normal functions of the body during the period approximately from 13 to 45 years of age. It may be that these organs have an important influence on the development of childhood, but we regard them as not necessary to the normal body after the menopause. For this reason, the ovary should not be sacrificed during the period of its physical activity, and it is with a view to this end that this paper is written.

An anatomic description of the ovaries is not essential

to the objects of this paper, other than to say that these organs are made up of a connective tissue of soft texture, in the meshes of which are lodged the Graafian vesicles in various stages of development, the blood vessels, and the nerves, all of which are enclosed in an envelope of firm nature. For our present purpose we are concerned only with the development of the Graafian vesicles and their subsequent behavior. In the normal ovary these go on to proper development, discharge their contents through a rupture in the surface of the ovary, at or about the menstrual epoch, and the cavity thus formed heals in due course.

These vesicles not rupturing and following the beforementioned cycle, retain their contents and become retention cysts and are single or multiple, according to their number, and in size they vary from a minute vesicle to a sac holding some gallons of fluid.

It is this cystic disease of the ovaries that is the chief cause for surgical intervention, since it is the form of ovarian disease that most often produces symptoms calling for relief. The par-ovarian cyst does not belong to the class under consideration, as it may exist with a perfectly healthy ovary.

It is a matter of common observation that the monocyst is not generally painful, nor is it a source of much inconvenience until large enough to cause pressure symptoms. On the other hand, the ovary filled with small cysts is always painful, though it be little, or not at all enlarged.

It has been well said that ovarian disease is not easily diagnosed and that it requires much practice to be able to palpate the ovaries; and from an experience of twenty years in this line of work I can personally testify to the

truth of both propositions. Many cases of ovarian disease are overlooked, and many an inoffensive appendix has lost its happy home through the tendency of ovarian pain to radiate up into the iliac regions. The patient who has long had pain in the sides, absent, scanty, or painful menstruation, is generally anæmic. Some tenderness to pressure over the appendix is liable, in the hands of an experienced surgeon, to send her to the operating table to have an anæmic, possibly catarrhal, appendix removed through a small incision in the side; and though the operation is a success as far as it goes, and temporary relief may attend the enforced rest of the post-operative period of treatment, yet when she resumes her usual vocation the pain will return and the anæmic dysmenorrhœa and nervous irritability will continue, in spite of the administration of iron, arsenic, and other tonics, combined with enforced right principles of living.

Had the operator made a median incision, or one through which the ovaries could be reached, removed the appendix and then brought up the ovaries, he would probably have found them full of cysts, and had a resection of the portion of the ovary containing the cysts been cut away and the ovarian wound sutured with catgut; then in nine cases out of ten, the trouble would have been relieved, or fully removed.

The condition thus briefly described is most common in young womanhood or in married women who have not conceived. Ovarian disease is less common in women in the child-bearing period, though it is often a troublesome complication of pregnancy.

The cause of this perverted histologic function that produces these retention cysts is not clear, and is attributed to various conditions by those who have made it

a study. The pathologist speaks of it as the result of a form of chronic inflammation, though in simple cystic disease there is little macroscopic evidence of inflammation.

The ovaries are also the seat of other forms of tumor, both benign and malignant, and when the former, a part of the ovarian tissue should be left, but if malignant, it is necessary, of course, to make a total extirpation. The wisdom of leaving any healthy part of a partially diseased ovary may be questioned, by some; but it is better to risk the possibility of a subsequent operation than to precipitate the menopause in young women. In two cases where I have done a partial resection of the ovaries, I have had later to remove the last vestige of ovarian tissue, with the result of completely removing the symptoms. Both cases were young girls of 16 and 18 years; and both had decided nervous phenomena, extreme irritability, with hystero-epilepsy, and were confined to bed a greater part of the time. After a second operation they remained well.

These are exceptional cases, and the only ones I recall requiring the complete operation subsequent to the partial resection, and indicate that possibly the internal secretion of the ovary may have a perverted influence, causing a want of nervous balance, which condition could not be proven until after the partial resection had been done. Investigation along the line here indicated would carry us into the field of organo-therapy, of which we at the present time know little, yet from which we hope much.

I have done many operations for the relief of pelvic disease, uterine displacements, and lacerations that did not give full relief in some of them, mainly, I now believe, because I did not remove the ovarian cysts, which

were doubtless present. It is now my practice to combine the ovarian repair with the plastic work, and my results are immensely better.

The operation that I have called repairing the ovaries has to me been most satisfactory, and, I believe, will prove so to all who practise it. The technique is simple:

Bring up the ovary between two fingers after separating the adhesions, if there be any, and generally there are not in simple cystic disease. The ovary may be so held, or caught with a special forceps, and an incision made along both sides, intersecting at the ends. The island of tissue thus marked out is cut away, and any vesicles presenting on the cut surface may be punctured and treated with iodine, if desired, after which a double row of continuous catgut sutures the first, completely buried in the base, then the second row more superficial, until the suture returns to the starting point at which it is tied. This will be found to have stopped all hemorrhage, and the ovary may be dropped back to its place and given no further attention. Both ovaries are frequently found diseased alike; but often the disease is confined to one side; and, in my experience, unilateral disease is most frequent on the right side.

Since operating in this manner on the ovaries, I have had less occasion to concern myself about the so-called displacements of the ovary, because a tender ovary is always cystic, unless affected by some other form of disease, hence should, in my opinion, always be treated by laparotomy, unless there be some contra-indication to this route of approach. It may be possible to operate through the vagina and cul-de-sac in women who have borne children; but it is not in these cases of relaxed pelvic tissues that we find the form of disease under consideration, but

in early womanhood, or in her who has been married some years without conception, whose tissues are firm and vaginal approach to the pelvic organs very difficult.

One mother in our city is proudly wheeling about the streets a fine baby, which, in the first four months of its fetal life, was crowded by an ovarian cyst four inches in diameter, which I removed with a most happy result. Another woman, married for six years and apparently sterile, became pregnant after the removal of the appendix and a part of both ovaries, and gave birth to a fine baby. The removal of the ovaries in this case, though diseased, would have been an outrage to nature. This list could be continued indefinitely. Pregnancy is no contra-indication to operation. I frequently operate on and around the pregnant uterus without disturbing the uterine contents in the least. Extreme care and gentle manipulation are always observed under such circumstances.

It is now a hundred years since McDowell did the first ovariotomy; then, without anæthesia or asepsis, it was a most formidable operation, only to be undertaken when life was in imminent danger. For nearly three-quarters of a century it was an operation only done for the removal of large tumors, or when there was urgent need. Now a very large ovarian tumor is not often seen.

Anæsthesia, asepsis, and skilled operative technique have robbed the operation of its terrors, and ovarian disease is relieved in its incipiency. In thus removing disease in its beginning, this branch of surgery is keeping pace with other branches of the healing art, and while we may not be able to prevent disease, we can, by early treatment, reduce human suffering to the minimum.

IV

Sepsis

(1910)

Sepsis as one of the deceased conditions of the human body has been known for all time and is still encountered with unabating frequency. Modern science has learned its cause and points out the principles of its treatment and, in some forms of the disease, has discovered a specific. Sepsis is now universally recognized as a condition resulting from the invasion of the body by pathogenic bacteria in numbers sufficient to overcome the natural resistance the host, and, by the production of toxins, so disturb the physiological functions as to cause symptoms of disease. Sepsis is a general term so broad in its application as to embrace all acute diseases; but, in the short time at our disposal, we will confine our paper to a consideration of the forms attending the invasion by pus-forming bacteria.

With a few exceptions, the treatment of septic conditions is empirical. These exceptions are smallpox, diphtheria, rabies, and tetanus. For these we have specific virus or serum. Antitoxic sera for other forms of infection exist, but they cannot as yet be called specifics.

The light of experience alone must guide us until we are able to determine what particular germ has invaded the body and find what is necessary to neutralize the toxins and to increase the resistance of the body to that particular germ, then what principle, be it the product of

physiological or of synthetic chemistry, can be added to the blood of the host, and a cure effected without all the dire results that we, in the present imperfect state of our pathological knowledge, are compelled to witness.

I believe that serum therapy will in time be an almost certain means of curing sepsis; but until that time comes we must be guided by the light of experience of ourselves and others in the treatment of infections, which come to us in great numbers and in varied forms.

In the treatment of these conditions two indications predominate, the one depending to a great extent on the other: to inhibit the growth of the germs and to neutralize their toxins; and to increase or build up the resistance of the host. To accomplish the first, it is only necessary to inject an appropriate serum, as in diphtheria. For the latter, we must depend on phagocytosis; and in our present knowledge this power of the lewcocytes to destroy invading germs is the chief element in the curative principle, and all other forces which contribute to the production of immunity have for their object the support of this law, propounded by Metchnikoff years ago.

Let us see what Nature does and be guided by her example. When a tissue is invaded by septic germs there is at once an increased blood-supply sent to the part; the vessels become enlarged; there is redness; there is increased chemical action, due to the presence of the invader and its toxins; there is heat; there is rapid transudation of serum into the perivascular tissues, accompanied by migration of lewcocytes. That causes swelling, and the attending stretching of nerve-filaments and irritation of the toxins cause pain, so that we have the classi-

cal cycle of inflammation that has been known since the earliest days of medicine: *calor, tumor, rubor, dolor.*

This is the storm-centre of the infection; phagocytosis is going on. If the germ is sufficiently virulent, the phagocyte dies and becomes a pus cell, and the accumulation becomes a pus focus or abscess. While all this is taking place, the lymph-spaces, channels, and nodes are busy taking up and distributing the products of the warfare, and what was primarily a local infection now becomes general, with symptoms modified only by the virulence of the infection and the susceptibility of the patient.

The logical conclusion, therefore, is that, if we cannot attack the germ directly, we must keep the invaded body in the highest state of efficiency, and to do this, proper food and medication must be given. The channels of elimination must be kept open as a drainage from the body generally, and the infected fluids must be removed from the infected focus by means of local drainage through puncture, if necessary. If natural resistance cannot be stimulated by a specific serum, it must be built up by appropriate nourishment. Medication is secondary, and can only help to control physiological function.

The question of nourishing the patient is often a serious one, since, with the weakening effect of the infection, the digestive forces are weakened, and food not tolerated; but pre-digested or easily digested foods can usually be given in sufficient quantity, either by stomach or rectum.

As to medical remedies, I have little confidence in any of them further than, as stated before, to keep the bodily functions performing properly; though, being accustomed to look at these cases from the standpoint of the surgeon, I may have overlooked the value of medicines.

We are told that alcohol, quinine, and strychnine are the sheet-anchors in the treatment of sepsis; and many good authorities add others to this list, especially nuclein and echinacea, and since none of these is apt to do harm and may do good, we may give them.

If alcohol is to be given, I believe its beneficial effects are early and late. It is probably not beneficial in the intermediate stage.

In a recent personal experience with an infected finger, I found the amount of alcohol contained in a glass of beer raised the blood pressure and increased markedly the pain in the infected area. Alcohol and strychnia would seem to be more applicable to those cases characterized by general systemic infection, as evidenced by sweating and relaxation, rather than those cases where the inflammatory products are confined within a localized focus, as evidenced by throbbing pain.

As to those fulminant cases of infection that pursue a rapidly fatal course, I have had little experience, though with less acute and chronic forms my experience has been large. In the first-mentioned class, I should rely very largely on stimulants to carry the patient over the shock of the invasion and until the reserve forces of the patient could be summoned in defense. The cases of this nature I have seen, chiefly of puerperal origin, seemed to defy all treatment; and I believe you have all found the same true.

Drainage from the storm-center is to be accomplished by dilatation of the capillaries and veins, thus favoring the ready passage of blood through the diseased tissues. Poultices, heat and moisture, do this, and that is their only value, though that it is at times great. I have much confidence in the old fashioned flax-seed poultice properly

made and applied, even though its reputation suffered greatly during the ultra-aseptic period of surgical science.

The mixture of kaolin, glycerine, and essential oils, under the various trade names, has many adherents in the profession, and may have some value. Theoretically, it ought to be good, since the heat it holds in and the hygroscopic effect of the glycerine in drawing water from the tissues would favor dilatation of the capillaries and transudation through the skin. It is necessary that good arterial blood be supplied to the invaded tissue and that the vitiated venous blood should be carried away. It is also proper to encourage as much as possible the discharge of lymph, since this fluid is the chief medium by which the bacteria and their toxins find their way into the systematic circulation and, on account of the peculiar structure of these lymph channels, the disease elements find ready access to the surrounding tissues. An infected focus accompanied by extending lymphangitis will show a red area for some distance on each side of the lymph stream. Such cases are immediately benefited by multiple puncture in this reddened streak, and though the discharge from the punctures soon stops, the excess of septic matter is thrown off and the natural resistance of the tissues comes to the rescue.

Incision of an inflamed area is beneficial in proportion to the amount of local depletion accomplished and to cutting efferent rather than afferent blood vessels. Therefore, incision of such area must be done freely, but carefully. Iodoform gauze packing is good, for the reason that the cotton fibres of the fabric make a good capillary drain and draw fluid from the tissues, the iodoform in the meantime inhibiting the growth of the bacteria; and

when the gauze is prepared by the glycerine method this latter agent increases greatly the hygroscopic effect of the gauze. These opened lymph spaces soon become sealed up and the discharge stopped, but not until sufficient drainage has been provided to preserve the tissues from extensive pressure, necrosis, or destruction by germ invasion.

The greatest number of infections occur in the hands and feet; no doubt because of greater exposure of these parts to injury and to the bacteria. The method of treatment of these cases that gives me greatest satisfaction is to incise or puncture the infected area and to cover with gauze wet in a 1/1000 bichloride solution; cover with gutta-percha tissue, cotton, and bandage, and put the part at rest. This retains heat and moisture, and the mercury seems to be absorbed by the tissues in sufficient amount to exert its antiseptic effect. After twenty-four hours of such treatment, a reddened and inflamed surface will be found white and shriveled, and the condition much improved. The red streaks upward toward the body will yield to the same treatment; or, if multiple puncture cannot be made for any reason, a superficial lymphangitis will yield readily to inunction with Enguentum crede. This latter agent has given me excellent results in the treatment of erysipelas and other forms of dermatitis of apparent streptococcic origin.

Properly to apply the remedy, the skin should be washed with soap and water and dried, the ointment then being thoroughly rubbed into the skin and a sheet of gutta-percha tissue applied, to extend for two or three inches beyond the blackened area. One of the objections to the ointment is that it blackens everything it touches.

The tissue avoids this and at the same time holds the crede close to the skin, and absorption is better favored.

In the treatment of sepsis the first object of treatment is to minimize the blood-poisoning and the second is to prevent the destruction of tissue and abscess-formation. This is possible in superficial infection; but in those more deeply seated, as, for instance, when bone or tendon is involved, there will almost certainly be some sloughing. These deep-seated inflammations are helped by poultices, though early incision must not be neglected.

Wherever tissue is being destroyed and pus is forming, drainage should be provided, and with the possible exception of abscess resulting from tubercular disease of the spine, I believe in early and free incision. Tubercular abscesses should be aspirated and the cavity injected with iodoform emulsion.

Puerperal sepsis is a form of the disease under consideration that gives us the greatest anxiety, the more so because we generally feel that it should not have occurred and might have been prevented. It is peculiarly alarming to the doctor, on account of its sudden onset and the violence of its symptoms. Thorough washing of the uterine cavity should be done, being careful not to curet or open up new portals of infection. Drainage of the cavity is important, as infection is often kept up in a flexed uterus during the second week of convalescence. I have often observed such a uterus discharge, an ounce or two of lochia, when the canal was straightened out with a probe. It is my practice to pack the infected uterus loosely with iodoform gauze, and if there are indications that the infection has extended to the periuterine tissues, I open the cul-de-sac and introduce iodoform drainage. I have never seen harm follow the opening

of the cul-de-sac, and am confident that it has saved some patients for me. In these cases it is my practice to apply imguentum crede to the lower abdomen and to the groins. In my cases I have found very little need for constitutional treatment other than to keep the body functions in proper condition.

I recently asked a medical friend who stands high in the counsels of the profession what internal treatment he gave in such cases. His answer was "milk."

The most appalling infection with which we meet is that of the peritoneum due to appendicitis or the rupture of some internal viscus. The watchword in the treatment is: get at it early; open, remove the offending organ, or repair the rupture, wipe out the drain. The greatest cause of failure in these cases is diagnosis made too late. The diagnosis of peritonitis is comparatively easy, and the only treatment is early operation. Of course, if the diagnosis is made late and the infective focus is walled off, it is sometimes safer to wait; but more cases can be saved by operation within the first few hours of the onset than by any other means.

These conclusions I have reached after an extensive experience in the treatment of acute septic peritonitis, all of which cases have died when the infection was general and over twenty-four-hours old.

With this brief outline of the treatment of some forms of sepsis, I leave a subject fraught with the greatest interest to our profession and a constant menace to life and health of our patients as well as ourselves. We believe we are approaching the time when scientists will have given up the means of determining the cause of sepsis in each individual case, and that we will have the remedy at hand for its successful treatment. Those patient in-

vestigators who are endeavoring to determine how the human organism may successfully combat the invasion of pathogenic bacteria are engaged in a work that must eventually result in the highest good to mankind.

V

Presidential Address

(1914)

For many years I have been railway surgeon for the Chicago & Northwestern and Soo lines, and have contributed to the scientific programs of the meetings of both associations. As President of the Soo Surgical Association, in 1914 the following address will show something of the trend of thought at that time:

The Soo Railway Surgical Association, at its eighth annual meeting, views with pride its past history, and looks forward with bright prospects to a long and useful career in the future.

As its President for the 1914 session, permit me to acknowledge my high appreciation of the honor conferred upon me, and to express the sense of the heavy responsibility in maintaining the high standard set by my predecessors. In bringing this meeting to Ashland, we realize that it is the smallest city thus far that has been honored by a meeting of this Association, but we hope you will find a warmth of welcome here that will in a measure compensate for the lack of entertainment and facilities for instruction possessed by the larger cities.

The Soo Surgical Association takes high rank among the organizations formed for the advancement of theory and practice in surgery, and the great railway system that it serves must view with appreciation and approval

its efforts to keep abreast of the times in everything that makes for efficiency and perfection in its medical service. This Association, like any other organized body of workers in the field of surgery, has before it the great problem of direction and conservation of human energy, and the maintenance of the highest possible state of human efficiency.

In fulfilling this mission, it falls first within the scope of the railway surgeon's duty to determine the capacity and fitness of men to do the work they wish to undertake; and, second, to restore those incapacitated by injuries so there may be a minimum of suffering and loss of time, and skill and judgment are required in determining the men's capacity and fitness for certain kinds of work, and equally able should he be who is to treat the injured, that the above-named conditions may be fulfilled.

The railroads are ahead of most organizations employing labor, in that they insist that everyone entering their employ shall pass a satisfactory examination. I have often wished that every employer of labor would do the same. Of the annoyances that come to us, there is perhaps none so great as when an injured man endeavors to bring in an old injury as a recent one so as to lay the responsibility where it does not belong. A concealed disability may cause trouble and lead to long, tedious, and expensive litigation; and, as a result, men are encouraged to conceal their disabilities until opportunity is afforded to shift the responsibility onto some one else,—usually the employer or some one who is able to pay well for it. Where a careful physical examination has been made, the employer is relieved of unjust liability and the employee of temptation to shift the responsibility to where it does not belong. Every day we see cases of

alleged injury, claiming compensation and often looking for large indemnity for a condition that we are satisfied antedates the present accident. Another trying situation is to deal with the malingerer and the man who tries to make himself think he is hurt much worse than he really is, when there is a possibility of good indemnity in sight. These are the cases which tax the surgeon's skill, judgment, and tact to the utmost, for he occupies, to a certain extent, a judicial position, and if conscientious,—as surgeons most all are,—he will endeaver to decide a case on its merits.

The railway surgeon must not only possess diagnostic acumen, skill, and tact in handling injured cases, but he must be able to determine when recovery has advanced so that the patient may be discharged from further treatment, and when the time has arrived when he may safely return to work. It is noticeable that patients are not over-anxious to return to work after an injury when someone else is paying the bill. There are exceptions, of course; but I think I can safely say that all surgeons dealing with accident cases will agree with me. Here is another occasion for the exercise of the surgeon's judicial capacity, in determining the extent of a disability and its effect on the patient's capacity for work. Most men are honest; but few know the border-line between their desires and their just deserts.

Although a representative of the railway company, the surgeon is also the representative of the patient entrusted to his care, and is just as anxious to see justice done to the one as to the other. If justice is to be tempered by sympathy, the patient is favored, for it is but human nature to extend our sympathies to the weaker of the two in a controversy.

When the functions of the railway surgeon are summed up, it appears that his part in the economy begins before the man is hired and continues throughout his service, and while it would seem that the employee should disappear from the medical department when once he has passed a satisfactory examination, yet, properly speaking, every workman should be under the eye of the department at all times, that his activities may be properly directed, his shortcomings discovered, and his surroundings kept in a state that will be conducive to the highest efficiency. I am aware that some will hold that the medical department has nothing to do with the employee after he has passed his examination until his service is interrupted by illness or injury; but it goes without saying that a wise and prudent medical supervision may do much to minimize the human hazard, lessening the liability of men to give way under certain stresses, or at times to relax in vigilance and caution.

As we review the work of our Association and inquire into ways and means of better fulfilling our mission, we are reminded that in every field of effort there is much to be done before the ideal is attained. Every surgeon, trying to do up-to-date surgery, feels the lack of facilities to make his working system complete. Only the larger clinics can have the corps of assistants, laboratory experts, history takers, and X-ray operatives necessary for thorough diagnostic work, and an efficient "follow-up" system of treatment. Hospitals, as we usually find them, are poorly equipped to help the surgeon in these all-important details. The lack of a sufficient number of interns and properly-trained assistants makes a serious drawback.

We hope that the advance being made in medical teaching will bring about improvement in our hospitals,

and that the facilities for instruction and training afforded by our hospitals, will be utilized by the younger members of the profession to the mutual advantage of all concerned.

It is not easy to get interns to accept service in the hospitals in the smaller communities, though they vie with one another for appointments in the metropolitan institutions. This is unfortunate, but seemingly inevitable. The inspiration of medical teaching and the spirit of investigation that pervades the larger medical centers have not yet spread to the smaller hospitals, but it must surely do so, for a hospital admitting from one thousand five hundred to two thousand patients yearly has facilities for excellent training of physicians and surgeons in their first year of practice.

In smaller institutions, the human element is more in evidence,—doctors get nearer to their patients, learn the comedy and the tragedy of inner life, and cultivate qualities that attract. The cold scientific facts of a four years' course in medicine are all very well in their way,—in fact, are indispensable; but they alone poorly fit any one to practice the healing art. There are many personal qualities that are not machine-made, and must be cultivated by close study and association with people. The hospital affords this opportunity. Now that the European War will put a stop to the medical shrines of the Old World, perhaps we will give our attention to developing our own clinics and hospitals.

Already throughout the country it is being demonstrated that good work is being done in the moderate-sized hospitals, and it will be interesting to watch the progress of reorganization of methods and improvement of service in these institutions. Herein lies the most promising field of medical progress.

VI

Conservitive Surgery of the Extremities

(1915)

In all cases of injury to the extremities, where loss of tissue is inevitable, next in importance to the minimizing of the dangers of life is the conservation of the injured tissues; and it often perplexes the surgeon to decide what can be saved and what must be sacrificed.

It is self-evident that the usefulness of the part to be saved should alone guide us in our efforts to repair, aside from appearance or any other consideration. When the surgeon has decided to amputate, it is a very great temptation to him to get a neat-looking stump, and he is apt to fear that a projection here or there, or a deviation from the lines of symmetry, may be taken as a reflection on his mechanical skill; but a thumb or a single finger projecting from the remains of a mutilated hand, while it may not be a pleasing sight, is of inestimable value to the man when compared with the total loss of the member.

While the principles of repair are the same in the hand and foot, the widely-different functions of the two members make it necessary to consider these functions in reconstructing the injured part. While the prehensile functions of the hand must be taken into consideration, when reconstructing a mutilated foot we need only pay heed to the bearing surfaces.

There are three phases of every severe injury: first,

the effect on the vital functions of the body as a whole; second, the extent of injury of the tissues involved; and, third, the rôle played by infection. The first indication is to be met by proper attention to hemorrhage and shock. The second, by proper application of anatomic knowledge and mechanical skill. The third must enter into the question of the vitality of the structures to be restored and the resistance of the organism.

Many injuries are of such nature that there is no question as to the course to pursue. It is the border-line cases that often cause us to be perplexed and uncertain as to the best procedure; and, rather than to dwell at length on the academic phases of the subject, I will draw from my personal experience a group of cases, illustrating the difficulties that often beset us in emergency surgery.

A man had his right thumb cut off through the metacarpo-phalangeal joint. It was a clean, transverse cut through the joint, not quite complete, there being a small amount of skin and subcutaneous tissue remaining on the inner side, by which the thumb still hung to the hand. The attending doctor stitched the thumb back into place, hoping that it would unite. It failed to do so, however, and in a few days became gangrenous, and had to be removed. The head of the metacarpal stood almost at the level of the cut tissue, and realizing the importance of this bone, to form an opposing member to the fingers, I made no effort to cover the end of the bone with a flap, but left it to heal in by granulation. It healed in due time, and the result amply justified the course adopted. By having the whole of the metacarpal, there is sufficient opposition to the fingers to give him a considerable grip, the importance of which one can appreciate

who has seen the loss of the thumb, including the metacarpal.

The rôle played by this metacarpal bone was well shown in the case of an old man who, one wintry night, going from town to his home in the country, and being under the influence of alcohol, lay down by the roadside. When found, both hands were frozen, so that there was finally a separation of the fingers and thumbs of both hands at the metacarpo-phalangeal joints. Healing finally took place. The stumps were nicely rounded off, but it was not possible to grip anything, and he was therefore entirely helpless. In studying the case, I hit upon a simple device, which gave him a grip on such small objects as a fork or spoon, which enabled him to feed himself. He could also hold a pen or pencil and could write fairly well. After a period of helplessness, he was delighted to have this much of the function of his hand restored. The device was simply to cut the web between the metacarpal of the thumb and that of the forefinger, so suturing it as to leave a notch, giving a grip as before mentioned. This case afforded the most striking example of the value of all of the metacarpal bone of the thumb, and convinced me that it should always be saved if possible.

A man's hand was blown off by an explosion of dynamite. The ragged, shapeless mass of lacerated tissue, hanging from the end of his arm, bore no resemblance to a hand. The wrist was torn open, and the radius, broken off two inches above the lower end, protruded from the wound. To contemplate the possibilities of saving any part of the hand was not encouraging; but, finding the ulnar artery still intact, we set about to reconstruct a part of the hand. A Lane plate was put on

the fracture of the radius, so as to support the wrist, and then, by trimming away the fragments and drawing together what remained, as far as possible, leaving the surfaces to granulate where they could not be covered, we finally succeeded in saving the outer half of the hand, with the last three fingers. We, therefore, obtained a salvage from the injury, the great value of which can not be estimated. The possibility of a clean stump at the wrist, with a short period of disability, presented itself for a moment in this case, as it must in all such cases; but we should not let this outweigh the possibility of saving any part of the hand, for, no matter how unsightly the result may be, the part saved is of greater use than any artificial appliances that can be devised. The smooth stump of a severed member may indicate the mechanical skill of the operator; but it is far better that the unsightly remnant of the hand bespeak the surgical judgment of the operator, who saved all that could possibly be of service without regard to appearance.

A boy had his elbow torn away by the discharge of a shotgun. The entire joint was carried away, with about two inches of the humerus, together with the soft parts for one-half the thickness of the arm. The arm presented a hopeless appearance, but on examination we found the vessels, nerves, and part of the muscle tissue intact, and encouraged by this fact, we took a long Lane plate and bent it to an obtuse angle, fixing one end to the stump of the humerus and the other to the ulna, using screws, as is the usual method of bone-plating. This held the bones in position so that the arm could be handled. The skin and other soft parts were then drawn together as nearly as possible and sutured, and where there would be too great tension, the wound was left

open, for drainage and to heal by granulation. With a specially-constructed metal splint and moist antiseptic dressings, the wound healed in due time. The plate was finally removed, to allow motion in the elbow, and as the space between the bones filled in with fibrous tissue, a new joint formed, which has become serviceable to a surprising degree. There is an efficiency in this arm of at least 75 per cent of the normal.

The writer has had, during the past year, three cases of compound dislocation, one of the shoulder and two of the ankle. All died from gas bacillus infection, resulting at the time of injury. They lived respectively ten, nineteen, and thirty-two days. In one case we did not amputate; in the other two, we amputated as a forlorn hope.

An electrician was caught by a shaft in a paper mill. He was whirled violently, his clothing being torn completely from his body. The shoulder was torn open, the head of the humerus protruding through the skin. There were numerous abrasions over the body. After being brought to the hospital, the dislocation was reduced with the usual antiseptic precautions. The physical condition of the man was good; but within a day or two it became evident that the wound was infected, and the discharge became offensive, indicating gangrene. A general systematic infection followed, from which the man died on the tenth day. As soon as the infection became evident, the question of amputation was raised, but the suggestion was promptly rejected by the patient.

A man was caught in the overturning of an automobile, resulting in a compound dislocation of one of his ankles. The attending physician reduced the dislocation and sutured the wound, putting in drainage. He was

brought to the hospital and placed in my care. Within twenty-four hours it was evident that infection had taken place, and the sutures were removed, to promote more complete drainage. Within the next twenty-four hours a general systemic infection was evident, and the leg was swollen, boggy, and discolored up to the knee. I explained to the patient the seriousness of the situation, and advised amputation of the leg. This he at first refused, and he persisted in his refusal for three weeks, at which time he became convinced that he must either lose his leg or his life,—with the probability strongly in favor of losing both,—and he consented to have the amputation done. It was too late, and he died of general septic poisoning, on the thirty-second day.

Another case, very similar, occurred about the same time. A farmer was caught in a mixup with a runaway team and sustained a compound dislocation of the ankle. He was brought to the hospital, and the usual antiseptic treatment was applied to the joint. Infection soon became evident, and it proceeded promptly up the lymphatics of the leg. We explained to the patient the seriousness of his condition, and advised amputation, which was done, but too late, and he, too, succumbed to general septic infection, dying on the nineteenth day.

These cases prove what a difficult problem we have on our hands when a healthy man is suddenly stricken by an accident that so injures an extremity that loss of a part or the whole of it is inevitable; and it is but natural that the victim of such an accident cannot become reconciled to the loss at once, and often does not give his consent to amputation until infection has made such inroads that it is too late to get a good result, and, often, to save the patient's life. The surgeon realizes how hard it is for

a hitherto normal and vigorous man to be thus suddenly brought face to face with the prospect of loss of a hand or a foot; and this, together with the fact that we are sometimes able to save a part that we at first thought hopeless, induces us to take chances with conservatism that we later regret, especially when cases go bad as did the three just mentioned. Every surgeon of experience recalls cases in which he has yielded to the wishes of the patient to take the chances in the attempt to save a part, and has reason to be glad he did so.

A little boy was run over by a sled, the runner passing over the thigh about four inches above the knee, rolling it under in such a way as to break the femur and so crush the soft parts as to destroy the vitality of the skin. In my efforts at conservatism, I wired the broken femur and dressed the thigh with a warm, moist antiseptic compress, and applied a specially-constructed metal splint, so that the dressings could be changed often without disturbing the fracture. The skin sloughed out in a ring around the thigh, three inches wide. All the soft tissues, excepting the muscles, blood vessels, and nerves, came away. After patient and persevering treatment, I had the satisfaction of seeing the leg heal, and a union of the fractured femur. A deep annular scar surrounded the thigh at the point of injury, and threatened seriously to interfere with the nutrition, growth, and development of the leg. I therefore bridged this scar with a sliding flap from the upper part of the thigh, and thus succeeded in relieving the constriction. A good, serviceable leg resulted, which grew and developed with the other leg, almost as well as if the injury had not been received. The initial indications in this case were strongly in favor of

amputation; but to have done so would have been a calamity indeed.

Crushing injuries of the foot often tax our surgical judgment and ingenuity to the utmost. It is easy to cut away a part; but, when once gone, it can never be restored; it is therefore the duty of the surgeon to devote his best efforts to the preservation of function.

A railroad brakeman had his foot crushed under a car-wheel. The front part of the foot was a shapeless mass, but it was found that the first metatarsal was still intact, and that the greater part of the other metatarsals could be saved. There was viable plantar skin sufficient to cover the ends of these bones, but it was necessary to leave a considerable area on the dorsum to heal by granulation. The ball of the foot was preserved and, though the toes were all gone, the result was excellent, and the man can walk without a perceptible limp.

In another case of a similar nature, where the tissues were more extensively crushed, I found it necessary to remove the heads of all the metatarsals, and was thus compelled to sacrifice the ball of the foot; but, by being able to retain at least three-fourths of the length of the bones, I succeeded in getting a very serviceable foot, though not as good a result as in the other case.

I have been compelled to amputate injured feet at all points, and, without following any definite lines as laid down in the text-books, I make it a rule to save just as much of the anterior part of the foot as I can get viable plantar skin to cover on the bottom and will leave almost any extent of dorsal surface open to heal by granulation.

Loss of the metatarsals, with the dropping of the front bearings of the arch of the foot, makes a complication very hard to correct, and the subsequent fitting of a shoe

a matter of great annoyance. Such a foot is a decided impediment in walking, and a permanent disability.

Conclusions:

1. In lacerated wounds of the hand, save every bit of tissue that can possibly be of service, and give special attention to the thumb and the parts that are to oppose it.

2. The metacarpals should be saved, if possible, and especially that of the thumb should be preserved, even though it be necessary to allow a considerable part of it to heal by granulation.

3. The Lane plate is a valuable aid in the repair of fractures and lacerations in the vicinity of joints.

4. A joint reconstructed with fibrous tissue, after the loss of the articular ends of the bones, gives such good functional result that the loss of the normal joint need be no obstacle to conservatism.

5. In the repair of lacerated wounds of the foot, the preservation of the bearing-points is of the greatest importance; these are the heel and the heads of the metatarsals. It is better to have a considerable part of the dorsum of the foot heal by granulation than to sacrifice these bearing points to get a covering flap.

6. In all granulating wounds, skin-grafting offers an efficient means of promoting healing and controlling the contracting effect of scar tissue.

7. No definite rule can be formulated to guide us in deciding when to amputate; and the border-line case must be decided by the patient and the surgeon in each individual case.

VII

Discussion of a Paper on the Hospital's Obligation to the Patient

(1916)

It is becoming more and more the custom for those engaged in an important work to meet at times with others similarly engaged, and, by discussion of subjects of mutual interest and by the interchange of ideas, increase the quality and efficiency of their work. The formation of your association and these well-attended meetings attest to the fact that you are alive to the growing importance of the questions of hospital efficiency.

The essayist has brought to our attention again the old adage that our best friends are not those who only praise us, and it is my desire that anything I may say here in criticism of existing conditions be taken in a spirit of friendliness, actuated by a desire to aid you in adapting yourselves to an improved, if not a new, order of things, which this meeting must have impressed you as having inaugurated.

Of the twenty-seven years I have been engaged in hospital work, the last eleven have been in a Catholic hospital, conducted by sisters, and, before offering any criticism or comment on the hospital as an institution, or on the sisters as conductors of such institutions, I desire to express my sincere regard for the sisters in their purity of life and motives, and in their devotion to their ideals

and to the work to which they have consecrated their lives.

The hospital is no longer only a place of refuge, where the sick in body or in mind may find kindly reception and hospitable ministration to their wants under the guidance of some specific form of religion. It has become a distinct entity in the business community,—just as necessary in our social arrangement as any other kind of business. From an institution conducted by religious orders, supported by voluntary contributions, and devoted to the charitable relief of the sick, it has grown, in many communities, into a business enterprise, supported by its earnings and conducted on business principles. While conducted as a mission of the religious order, devoted to the dispensation of charity, the public looked on with approval and extended a liberal hand in giving it aid and support; but, where it has become a business enterprise, and the public is expected to pay directly for what it gets, the public is beginning to want to have something to say about and direction in the manner in which the service shall be rendered, and the sooner the good sisters can be brought to realize that they are now a part of the business world and not, strictly speaking, a charitable or an exclusive religious institution, the easier will be their task in adapting themselves to the new order of things and satisfying the public they serve.

The hospital during the past quarter of a century has kept pace with the wonderful advances in every branch of human science. The era of anesthesia, and, later, that of asepsis, gave a wonderful impetus to surgery, and probably not in lesser degree has the discovery of the rôle played by bacteria in the cause of disease and its suggestion as to treatment and prevention led to the very

great improvement in hospital service. We do things now in medicine and surgery that were not dreamed of a generation ago. The surgeon invades with impunity the most remote recesses of the human body, and, whereas thirty years ago only the bravest or rashest of the profession essayed to perform surgical operations, now almost every graduate of a medical school is willing to attempt to take the human body apart and put it together again.

During this period of scientific advancement in the care of the sick and injured, the hospital has become a workshop, where the best-known methods are in use, where every appliance and facility is at hand for immediate service. Countless lives are saved by having at hand and being able to use the means of scientific invention and development. Therefore, so essential is the modern hospital in every department of our social life that it can no longer be regarded as the exclusive property of one class, sect, or nationality, and the group that controls it in any given community and desires to retain that control, must pay heed to the rights and opinions of others.

A few years ago, when the aseptic era gave such an impetus to surgery, many small hospitals sprang into existence and continued for a variable length of time, most of them finally merging into the sisters' hospitals, for the reason that the sisters could conduct the hospital more cheaply and with less trouble in administration; and the surgeon, tired of the details of management, was glad to relinquish this part of the work, in order to devote his energies to the strictly professional side. By absorbing the patronage and accumulated experience of these surgeons, the sisters' hospitals profited greatly.

There came a time, however, when the sisters said: "The hospital is ours, and we will conduct it in our own way, and you must accept without complaint such service as we wish to give." The result is that many surgeons are wondering whether they should accept the conditions offered or go back to the privately-owned hospital, which they can run in accordance with their own ideas. This is the condition which exists today in many places, and it is the duty of this association to give it attention and to determine whether it may not be better for the sisters to adopt a policy of greater efficiency and retain the control of the business.

The patient, on entering the hospital, has a right to a kind and cheerful reception, to judicious assignment to the proper department, prompt relief of urgent symptoms, a careful history, the efficient administration of all necessary therapeutic measures, a properly selected diet, a comfortable bed in a well-ventilated and properly-warmed room, and the attendance of a good nurse. These are the essentials that a modern hospital must supply; and, more than this, when patients are grouped together, proper provision must be made to prevent the communication of disease from one to another. Thus, to meet these requirements, the hospital must have an adequate organization. It must have team-work in the various units of the organization, and for team-work there must be a head with executive ability to organize and plan the work, and then see that it is done.

Can the hospital have a medical staff? This is a question we may well discuss. It is the ideal way, and in the cities, where numbers are large, it is entirely feasible; but in the smaller communities each doctor who sends a patient to the hospital expects to direct the treatment,

whether it be the administration of galenicals or the performing of a surgical operation, and he resents any suggestion or interference in his work that he does not ask for. To us who, in the smaller communities, are familiar with the jealousies and bickerings of the profession, the difficulty appears great; but the hospital will never reach its highest development until it takes upon itself the direction of the treatment of the patients committed to its care.

We come now to the question that gets us at once into deep water. Who is to be the judge of the qualifications of the doctor? The patient is not the best judge of who shall treat him; and yet, you cannot interfere with his individual liberties, nor deprive him of his choice. The sisters are not qualified, and should not assume the responsibility; so it should rest with a competent medical staff, through its chief, to assign patients to the department best prepared to treat them.

Our medical colleges issue diplomas that authorize the graduate to do anything he chooses, short of taking life, and excuses him if he occasionally unwittingly does this, and our State boards, after a further investigation, give them permission to practice within the limits of the State. The various cults, which find a short cut into the profession of healing, are also given permission to take the human body and do what they please with it. No one realizes so well as the members of the State board of Medical Examiners how inadequate is any system at our command to determine the fitness of men to practice medicine. The appalling ignorance, which so often attends and directs the treatment of the sick, causes us to wonder if there may not be some tribunal before which one may properly qualify before being permitted to

practice any and all branches of the healing art. Will the hospitals dare assume this prerogative? Can a system of co-operation between the doctors, with the selection of a chief-of-staff, be made to meet the requirement? It is a question to which we may well devote our most serious consideration.

It is difficult for hospitals remote from the medical centers to get interns, and it is a question whether it is not better to pay the interns a small salary in such institutions. I have found it necessary to offer our interns some prospect of remuneration in order to get and to keep them. It is true that the experience in a good hospital amply pays a young doctor for such service as he renders, but the preparation for a medical diploma nowadays extends over such a long period and the expense is so great that only a few men can afford to spend the extra intern year without some financial return. This is a debatable subject, and I will not go further into it at this time.

In a hospital of one hundred beds there should be at least two interns; and plenty of work could be found for four. The intern must not be a mere orderly, nor must he treat patients, except under the direction of some member of the staff. He should have time and opportunity for some original investigation, and should have a well-equipped laboratory at his service. He should have access to a good medical library and to the current medical literature. When we have worked out the intern question, so that we can have something worth while to offer our interns, we shall probably not have trouble in securing them, though probably the smaller and more remote hospitals will have to put up with the poorer material.

The information service of the hospital is a most im-

portant one, and has been well dealt with by the essayist. It is certainly distressing to anxious friends and relatives to receive an evasive answer to an inquiry about the condition of a patient, and the answers received generally impress the inquirer that the informant knows very little about the case. I recently visited a hospital in this city, and was shown its system of record-keeping on the desk of the information clerk a daily record of the condition of each patient in the hospital. It is an admirable system, and is worthy of adoption by every hospital. Nothing makes a better impression on the public than to receive a prompt and positive statement as to the condition of patients.

Next in importance to the medical staff is the nursing staff, and it is in the selection of the nurses and by the quality of their work that the character of the hospital is best shown. Doctor Bottomley has well said that the qualities of mind and of body necessary to be a good nurse are not given to every woman. The sisters hold it within their province to select those of their number whom they consider properly fitted for the work of nursing, and, out of respect to them, they are permitted to control their own affairs without interference, though we sometimes question their judgment in the selections they make for some kinds of work.

Were we to assume that all nursing should be done by sisters, we would realize that as an impossibility, as we must have lay nurses, and they must receive their training in the hospitals. The sisters' hospitals must share in the training of these nurses, and they have found the training school a necessity, and a valuable asset. We are aware that the peculiar community life of the sisterhoods makes it difficult to conduct schools for lay nurses, but they have

come to realize that this is necessary, and have met the situation in many instances very well. They find one difficulty, which seems to stand out in relief, and that is that it is foreign to their principles and practice to submit to any form of outside regulation, their principle being that they give no offense to anyone, and consequently need no interference from without. The State steps in and says it must have a voice in the training of nurses if it is to give them any authority, and that their selection must be made judiciously and their training be adequate. We may differ in our opinions as to how far a nurse should be trained in the fundamentals of medical science, but we are agreed that they should possess the qualities of mind of a good woman, and should have reached the age of accountability before having human lives placed in their hands.

Care must be exercised in the selection of nurses both before and after the period of probation. While nurses should be good and kind, as well as possess many other qualities essential to their work, stupidity must not be mistaken for goodness. At this point I desire to express my appreciation of the Committee of Examiners of Registered Nurses of the State Board of Medical Examiners and the work they are doing in elevating the standards of nursing in the State, and their efficient work in securing proper and uniform standards in the training schools of the State; and I would urge the sisters to receive the suggestion of this committee kindly, for its purpose is to help, not to hinder.

It has been well said that the highest duty of the hospital is the adequate care of and the greatest good to the patient, and every plan of the hospital and its management should be directed to this object. No distinction

must be made as to class, or nationality, or creed. The patient must be put in communication with relatives or friends at once, and, if a foreigner, with someone who speaks his language. He should have the mental and spiritual solace afforded by his priest or minister, but none of these should be permitted in any way to hinder the measures that may be immediately necessary to save life.

While I have consumed the time allotted for discussion, I feel that I have touched on only some of the vital questions that claim our attention in our efforts to make our hospital work better, and I hope that what has been said here will be productive of great good to the hospitals that we here represent.

DISCUSSION

Doctor Hoyt E. Dearholt, Milwaukee.—Mr. Chairman and Gentlemen: As I listened to Doctor Dodd's paper, I thought of saying something that he touched upon in his conclusion. My thought was this: this paper will not have been worth the writing if its message is given only to those of us who are here this morning. We, probably less than almost anybody, needed to hear what he has said. I consider it a most excellent paper, and the right paper delivered in the wrong place. I do not mean by that to detract from the reading here; but the real purpose of that paper should be to open the eyes of the people who do not know these conditions as well as Doctor Dodd and the other physicians who are here present know them. I should like to commend this paper to the consideration of our Committee on Health and Public Instruction, with the thought

that they may secure reprints of it and distribute it among hospital boards of trustees, public officials, philanthropists, and that class of people who, in the final analysis, are responsible for the bad conditions in hospitals.

In the management of hospitals, training schools for nurses, and kindred matters, we physicians have done what we used to do in all lines of social medicine, and that is, to take altogether too much responsibility upon our own shoulders. We have carried that responsibility without complaint and without asking other people who had the power to correct the conditions to carry their end of the load. Take the matter of hospital training schools. We know that in the past there has been a tremendous amount of exploitation of the women who have carried on the service burden of hospitals; we know that it is a question whether or not three years are ever required for their education,—at least, education of the character they receive; and yet, we have kept them in the hospitals. And why? Because we needed the service. We did not start out deliberately to exploit this class of women, but we had a great big obligation to keep the hospitals going and to render the service that could be rendered to the public. The public did not understand, and we did not make the public understand how much we were attempting to do that we should not have attempted to do. We should have said to the public directly: this hospital cannot be run at the price that we are charging for accommodation; or, what we are permitting the boards of trustees to charge for the accommodations; you are getting more than you pay for; somebody is rendering charity. The nurses have been rendering too much charity; the doctors have, and the interns. The benefits of the hospital come ultimately to the users of it,

as Doctor Dodd has said, and the users of it, one way or another, should be made to pay. Now, unfortunately, this touches the discussions that are coming up later on. When people are sick, they are least able to pay; and that is why some of us feel that the state and the public generally and the philanthropists must share in this burden out of their abundant means to do so.

As I said at the beginning, I should like to see Doctor Dodd's paper given very general publicity among the people who need the information most, and who have the power to correct and improve many of the conditions in a way to accord with the splendid ideals that Doctor Dodd has set forth.

VIII

Standardization of Hospitals

(1918)

The importance of the hospital as a public utility and a public benefaction has grown steadily in favor for the past quarter of a century, and commands our especial attention now because of the prominence given it by the conditions due to the war and the reconstruction period that is to follow it.

Hospitals have grown in numbers and efficiency, keeping pace with the rapid advances of medicine and surgery, and have become a recognized public need, supported by an appreciative public. The hospital is not the abode of pain and suffering as some suppose, for there is very little suffering in a well-conducted hospital, and it is seldom now that we encounter the dread of the hospital that existed a few years ago.

The hospital is a workshop where the doctor does his expert work,—and all expert craftsmen do their work in a shop properly equipped for all varieties of work to be undertaken. Not all hospitals are properly equipped; and not all the work in them is done by expert workmen. Sometimes the fault is with the hospital, but too often it is due to incapacity and lack of training of the workmen. Not infrequently the blame belongs to both, in their mutual effort to protect one another. In these days of scientific progress, few of us are doing our work so well but that it might be improved. The movement

of standardization of the hospitals is an effort to improve the service in these institutions and to bring their work into conformity with a set of standards that will result in better equipment, better management, better work, better records for future reference, and, consequently, better service to humanity.

A generation has seen the hospital grow from an almshouse to a place equipped with every device that ingenuity could devise for the relief of suffering humanity, available to rich and poor alike; but there is still much to be desired in the manner in which these institutions are conducted and in the way the work in them is done.

In my effort to cover the subject of hospital standardization within the limits of a short paper, I am admonished that I have entered a rather large field, and that what I shall say must be chiefly fundamental; but I hope that what I shall say will bring about a discussion of many points I know are uppermost in the minds of my hearers, and as progress in medical science must henceforth be dependent on the hospital more than on any other agency, it deserves our best consideration.

Much work has been done of late by the American Hospital Association, the Modern Hospital, the A. M. A., and the College of Surgeons, all tending to bring about a better understanding of our hospital problem; and a great good has been accomplished through the efforts of these organizations. Theorizing and analyzing will not accomplish anything without practical application of the deduction of the analysis, and words are of no value unless material improvement follows.

The hospital of today cannot be a success unless its ideals are the greatest possible service to those entrusted to its care; and the attainment of this object can only be

determined by popular approval and by careful and impartial analysis of results.

Hospital betterment must come through the medical profession, because that profession alone knows what hospital service should be; but doctors are inclined to leave this work to a limited few who are making a study of the subject, or who are actually engaged in hospital management.

The increase in the number of hospitals has been a factor in improving their quality; for it seems that in this, as in other lines of activity, competition brings better service.

Physicians and surgeons must be awakened to their duty in this regard; but, before pointing the way to others, they must themselves prove their ability to continue in it.

Wisconsin stands high in hospital ideals and practice among the States of the Union, as she does in the public health and other activities of the medical profession, and a brief survey of her hospitals seems fitting at this time.

In 1908 there were in Wisconsin 76 hospitals, aside from asylums and sanitariums, with a total of 3,380 beds. There are now, ten years later, 109 hospitals, with an aggregate of 5,375 beds,—an increase in this period of 33 hospitals and 1,995 [1] beds.

There are in these hospitals 32 accredited training schools for nurses, with 800 nurses in training. There

[1] In 1928 there are 214 hospitals with 6,374 beds,—1 bed to 457 people. In 1908 there were 2,681 doctors in the State; in 1918 there were 2,817; and now, in 1928, 2,896. There is one nurse for each 947 people, and one hospital for every 13,635 people. It is noted that nurses and hospitals have far outreached the doctors in the increase. The facilities of the doctor have increased manyfold, and better service has come in consequence.

are only 26 interns in all the hospitals of the State, according to a survey recently made by the College of Surgeons. These hospitals serve a medical population of 2,817 physicians and surgeons.

As to ownership: 60 hospitals are owned by individuals,—doctors and others; 35 are Catholic; 6 are city or county; 2 are owned by associations, and 5 are Lutheran. There are a number of homes and sanitariums that have hospital aids, but these are not counted.

There appear to be three classes of hospitals: first, the large public institution supported by the public treasury and conducted as a public utility; second, the hospital conducted by the religious orders, supported by their earnings and by the contributions of the charitably inclined; third, hospitals owned and conducted by individuals or associations formed for the purpose, depending for revenue on the earnings of the hospitals.

The first class is subject to the vagaries of politics; the second is under the restrictions of creed, and finds some difficulty in conforming to the requirements of modern science; and the third represents individual interests, community needs, or professional ideals. The last class comprises the smaller hospitals, and are likely to lack in equipment and scientific management.

All these hospitals, with the exception of some regulations by the State Board of Health, are left to pursue a course as dictated by their own consciences, and are accepted by the public at the rating they have arbitrarily set for themselves.

Progress is slow, especially in the institutions that have been permitted to establish their own ideals and to continue long in the exercise of what they have learned to regard as their unquestionable rights.

In the hospital problem today, the greatest need is not the building, not the equipment, but the service. Building, equipment, financial, and general management are essentials; but the finest set of tools in the world are useless in the hands of a bungling, incompetent workman. The expert will often do good work with very poor equipment. It will be remembered that Joseph Price said he could do the very best surgery with the ironing board for a table, a teakettle for boiling water, and a dishpan for his instruments. I once visited his hospital, conducted in a primitive way, and he was getting as good results as other surgeons. He, however, was a genius, whom all of us could not follow. Many of us recall much good surgical work we have done in the kitchen of a dwelling-house; but all prefer the equipment and conveniences of a modern operating-room, where the details of sterilization and cleanliness are worked out, and where plenty of assistance is available.

One of the crying needs is for the public to know what a hospital should be; and the people who must go to the hospital for treatment have no means of knowing the quality of service they receive any more than whether or not their doctor is giving the best service obtainable. If they are pleased, that seems to be the only answer necessary.

We wonder if the time is not coming when the doctors and hospitals will be required to answer to some tribunal in this world as to the quality of their work. Here is a fertile field of opportunity for the medical profession in the education of the public. It is apart from my purpose to discuss hospital management. Assuming it to be what it should be, let us consider the medical service; first, in relation to the staff.

Staff

In most hospitals no restriction is made as to the qualifications of doctors who practice in them,—a diploma and a license being considered ample proof as to moral and professional fitness.

It is one of the privileges of the medical profession that the doctor, so long as he keeps within the limits of the law, and these limits are not clearly defined,—may practice as he pleases, accountable only to his own conscience. It is to the credit of the doctor that he has generally proved worthy of the trust; though it is possible that, if his work were subjected to the scrutiny of a competent and impartial judge, the seal of approval would not always be put upon it.

It is not for the best interests of all concerned that doctors and hospitals are not accountable to someone; and the time is coming when the system of inspection and supervision of work will be established in hospitals; when those who manage them and are entrusted with human life in them will have to qualify for such work by special instruction and training; and when practitioners who treat patients within their walls will first have to establish their fitness to do so in some other way than by the means provided up to this time.

By the "staff" is understood the doctors who practice in the hospital. In but few of our hospitals do we find an organized staff of specialists, such as can work in harmony,—which is the ideal staff. In nearly all hospitals, doctors take care of their own patients, referring them to specialists only when something unusually technical is required. Among these there is little, co-operation though the interests of all would be better served if there

were. The lack of harmony is all too prevalent among us, in spite of the efforts that have been put forth to convert the profession to the modern ethical ideals; and in this we are better than we were in the recent past. Much splendid work is being done in the hospitals of Wisconsin, and it is not all done in the large institutions. Some poor work is being done by incompetent hands; but, taking it all in all, the work in our hospitals is to the credit of the profession.

We may pause a moment to analyze the lack of harmony in our profession. It exists, and probably always will, for nobody can interpret the mind of his fellow nor read the motives for his acts, and no one has time or inclination to explain himself fully to every one he meets. The individuals of the profession work not for themselves, and their achievements are common property. There will always be some who are willing to spend their lives working for the common good; and always there will be others who are willing to take a share in the product they did not help to produce; for human nature is much the same throughout the ages,—and in all professions.

In medicine, as in every line of human endeavor, there can be no progress except in service. Every successful enterprise must depend for its success on its measure of usefulness to the human family. Therefore, the highest ideals in the medical profession will always be in the majority among those who see in their professional work the real call to service, rather than an opportunity for material and personal gain. There will always be the honest doctor, who will get the best possible service for his patients regardless of his own interests. Of such should the staff of the hospital be composed.

There should be a chief, with the authority to assign patients who come promiscuously to those best qualified to treat them, and, as nearly as possible, should maintain a harmonious co-operation. If there be no chief of staff, the hospital superintendent should exercise this function and assign patients to doctors who have demonstrated ability in special lines, always keeping in mind the best interests of the patient. The practice of assigning patients to the doctor who belongs to the same church, or lodge, as the patient is found to exist, and needs to be curbed. Church, creed, or personal friendship should not stand in the way of best medical service.

Every man, woman, and child who applies for admittance to the hospital has a right to a thorough examination, and to a diagnosis arrived at after a careful examination and analysis of history and symptoms, nd then to be treated accordingly.

Records of large, well-conducted hospitals show at autopsy a large percentage of wrong diagnosis; and how far we must depart from the right diagnostic path in our hastily-made diagnosis and slipshod prescribing, no one knows. Nature is kind, and often cures where we have failed through wrong diagnosis and therapy.

After all, when we come to think that in medical or hospital work we are clothed with the functions of judge and jury, we fear the danger of becoming unwittingly the executioner.

Laboratory

Every hospital should have at its command a good laboratory. It should be in the hospital; but if not, it should be conveniently located so as to be readily accessible for aid in diagnostic work.

Today there is a scarcity of all kinds of hospital help, and the rarest of all is the competent laboratory technician. Laboratory reports, as sometimes put up to us by incompetent and unreliable technicians, comprise one of the evils we have to guard against, for laboratory findings, if incorrect, are worse than valueless.

There is not a more promising field for professional people than the laboratory; and yet it seems to be the hardest kind of work to get people to take it up. Special courses are being provided in the colleges; but there is danger of attempting to train within too short a time people who are deficient in preliminary education, in chemistry, in bacteriology; and here, as elsewhere, a little knowledge is dangerous.

I have had personal experience in attempting to keep competent persons in my laboratory; and the demand indicates that others are having the same trouble. There is a great demand for these experts, and they command higher salaries than the average clinical group can afford. In this, as in many other activities, we may have to mark time until the war is over, when, no doubt, there will be plenty of people who will take to this kind of work.

Every doctor who has a good laboratory, to help make and to check up diagnosis, knows what a comfort it is to have the laboratory confirm the diagnosis, or clear up for him some question of doubt.

The X-Ray Laboratory

No well-equipped hospital today is without an X-ray laboratory, and its need is so fundamental that it scarcely seems necessary to mention it.

The X-ray should, however, be in the hands of a com-

petent operator who has been specially trained in the taking and the interpretation of skiagraphs. The skiagraph can be one of our best aids; then, again, it can be made an instrument of deception, as all readily believe who have seen pictures that had been taken in certain positions and under certain conditions. Here, as elsewhere, honesty and efficiency are prerequisites.

Interns

Every hospital of 30 beds or more should have an intern, and an additional one for each 30 to 50 patients. This, not only on account of the advantage to the patient to have a doctor on hand at all times for emergencies, and to aid in carrying out the therapeutic measures ordered by the attending doctor, but also for the far more important reason that the intern year is the best part of the doctor's education. Here he is brought into intimate practical contact with the work he has been learning, and he goes forth on his medical mission infinitely better equipped than he could possibly be without this practical training.

All this preparation and accumulation of theoretical and practical knowledge reverts to the advantage of mankind, for anything that makes better doctors lessens suffering and prolongs human life.

The internship is the modern successor to the practical experience under a preceptor, which was the order a generation ago, and was the most valuable training then extant. A rather extensive experience with men just out of school, who have taken internships under my observation, has convinced me that as many as possible of our doctors should have the intern year; but this year should

be made as valuable as possible to the intern in a professional way, and he should be compensated financially.

But few students,—after the expense of a preliminary and professional education,—can afford to spend a year in a hospital without pay; therefore, I maintain that the intern should be paid a salary in addition to his living expenses. The amount of this salary must be left to the hospitals; but it impresses me that it should be at least $50.00 a month. It is commonly agreed that the intern should not be an orderly, and that he should have access to a good library, and be provided with a good working clinical equipment. The staff should see to it that he has every advantage of observation and participation in treatment under their direction.

Nurses

It is well recognized that nursing has made the hospital popular. Without nurses, the hospital could not exist, and surgery would be an undeveloped art. By using the hospital as a training school for nurses, a class of most useful people is developed; and no greater boon has come to humanity than the trained nurse.

Nurses, like doctors, must be systematically educated and trained, and the schools must conform to some acceptable plan so that a standard may be set and maintained. Registration is provided for those who have acceptably qualified themselves, while a nurse with R. N. after her name has given proof that she is entitled to the trust and confidence of the medical profession and the public.

Legislation in Wisconsin for the registration of nurses was begun in 1911 and in 1912. The administration of

the provisions of the law was placed in the hands of a committee of five, appointed by and under the jurisdiction of the State Board of Medical Examiners, in 1915, with which Board the Committee has worked harmoniously and effectively to the present time.

There have been registered in Wisconsin up to this time 1,863 nurses. Inspections of hospitals and training schools have been made, and a curriculum for training schools worked out in accordance with the most approved methods in nursing education.

The Committee rules that only hospitals of 30 beds or more, with a minimum daily average of 20 patients, can give adequate training to nurses; and the difficulties which have arisen in the enforcement of this rule have been in hospitals near this border-line. Some of the hospitals have resented the effort of the Committee to enforce its requirements; but, in the main, have complied when the real purpose of nursing legislation was understood by them.

The small hospital has much in its favor, as it indicates a desire on the part of the doctor to give his patients the best possible service, which he cannot do by treating them in their own homes. There are very few homes that have the necessary facilities for caring for the sick, even with the services of a trained nurse; besides, it is a matter of common observation that patients seldom do well in the environment of their own homes. Much ill-bestowed sentiment has been wasted in this way, especially in regard to children, who make good hospital patients when parents can be induced to leave them to the care of the hospital.

On the other hand, the smaller hospital is likely to lack in equpiment and in the facilities for treatment to be

found in larger and easily-accessible institutions. I would not discourage the small hospital, but would insist that it have trained nurses; that it be conducted in the same systematic way as the large hospital, and not undertake work it is not qualified to do. Small hospitals can do a great good in rural communities, or places remote from the medical centers; and I have seen it demonstrated that the small hospital, properly conducted, can be made self-supporting in a financial way.

It is evident that something will have to be done relative to the training of nurses in these hospitals. Doctors who are conducting schools in hospitals of less than 30 beds are demanding recognition for their nurses. There are in Wisconsin 56 hospitals having less than 30 beds, so the training of nurses is likely to become an active question soon. It is within the range of possibility that a system of affiliation will be established in making it possible for these smaller schools to obtain recognition. It is to be hoped that this will be brought about; for many of these hospitals are giving excellent training, and in many cases are making better nurses than the large hospitals. In this, as in every line of progress, there is much to be seen ahead. These small hospitals are the product of a need felt by the doctors in rural communities,—where distances are great and long drives necessary,—for a place where a limited number of patients may be cared for and given closer supervision and better treatment than they could get at home; and they must have nurses. In a way, this is a conservation of energy; for a nurse can take care of several cases, if they are grouped together, and the doctor can also take care of more patients. This is an important consideration during the period of war, as doctors and nurses are below the mini-

mum requirements of the civilian population, and the people must look to the hospitals for a greater part of their medical service. There is a sort of group-psychology in the hospital, and patients help one another. They also compare notes on the doctor and keep him from becoming careless.

Several suggestions have been made as to plans whereby a larger number of young women enlist for this service. The enthusiasm of enlisting for war work induced many to enter war service who would not have done so otherwise. These student nurses are to be sent into army and civilian hospitals for training. This is an excellent plan, and is only the continuation of the work started by the Nurses' Association and other agencies several months ago, with the purpose of having all hospitals of the State increase their number of nurses to full capacity. I have felt that it would be a good plan to meet the emergency by sending nurses into war work at the end of their second year, their diplomas to be withheld until they have served the third year to the satisfaction of their school. This would release a large number of nurses and would be a valuable war measure.

The Red Cross nursing service has been recruited from Wisconsin during 1917 and thus far in 1918 to the number of 540, and these splendid women are doing their part in the great world struggle.

Anæsthetist

It has become the practice in many hospitals to have a specially trained nurse as anæsthetist; and while objection has been raised to this, on the ground that the giving of an anæsthetic is a major medical procedure and

should only be undertaken by one who has full medical training, the nurse anæsthetist has become fairly well established. Few doctors care to give anæsthetics, and few can do so as a part of a general practice. It is not practicable for them to specialize in this line, except in the large centers. A doctor cannot very well combine this specialty with a general practice, for he should be available at all times for operative work.

Nurses appear to make the best anæsthetists. They are reliable and attentive to their work, and they possess qualities of manner that at once secure the confidence and trust of the patient, which is the first and most important stage of anæsthesia. Our State has ruled that the nurse may give the anæsthetic just the same as she would administer a medicine in any other way, and that the surgeon in charge of the patient is responsible for her work.

Now, as to the part to be taken by the Wisconsin hospitals in the war: there were 2,000 drafted men in the first draft with remedial defects and surgeons and hospitals were given an opportunity to give their services to these men who desire to be fitted for military service.

The surgeons generally offered their services; while the hospitals offered to furnish hospital service at actual cost; while county councils of defense were asked to provide funds for this purpose. Many of the men were patriotic enough to pay at least for the hospital care. Some have the nerve to accept the gratuituous service of the surgeon, and engage and pay for the best room in the hospital. Very few but who can pay for necessary hospital care without calling on the council of defense; and it is a test of their patriotism that they do what they can to fit themselves for military service without expense to the Government. This work is scattered over the State,

and can be done without subjecting surgeons to much expense and inconvenience, and they can do this among the many things they are cheerfully doing to help win the war.

Many of our hospitals will, no doubt, be called upon to take care of the returning soldiers, and on this account, as well as the probability of increased civilian needs, the hospitals should be brought to and kept at the highest degree of efficiency consistent with the scarcity of doctors and nurses. The Government encourages the building and maintenance of hospitals, recognizing them as one of the greatest public assets.

In conclusion, let us remember that progress toward our ideals is slow, and papers like this become a mass of meaningless words if some action does not follow to reduce our theory to practice. Our hospitals can be made better, and the doctors must lead the way. We can begin by demanding intelligence and efficiency in the management of the hospital. There are ways in which this demand can be enforced, though it may have to be done indirectly; and some people are not easily educated. The patient must have a reception suited to his or her temperament and needs; followed by a carefully written history; a thorough examination, specific directions as to treatment written down for the guidance of the nurse, and then be put to bed and made comfortable and to feel at home; then, as the case progresses, a clinical history should be carefully kept, to the end that results may be determined. Emergency cases will require temporary relief while the ceremonies of a patient's admission are in progress. It may seem superfluous to mention details so well known to all, but it does no harm to remind ourselves occasionally of elementary things. Intelligence,

painstaking care, honesty of purpose, and fidelity to the great trust reposed in us must actuate both doctor and hospital, or standardization of the hospital will accomplish little good, and we shall be found wanting in the great work so vitally dependent on the medical profession and all its allied agencies,—of which the hospital is one of the greatest.

IX

Ligation of Femoral Artery in Middle Thigh (1922)

J. K., a man aged 25, laborer, April 4, 1921, while employed on the construction of an ore dock, was struck by an iron rod about twenty feet long and one and one-half inches in diameter, which fell from the work above him. It came down endwise, struck him in the middle of the left thigh, and passed down through the popliteal space and out of the outer side of the leg, about the middle, and onto the ground, fracturing the fibula, in addition to inflicting severe lacerations of the soft parts. No seriôus hemorrhage occurred at the time, nor was there any more than slight primary shock.

The man was taken at once to the hospital, and the wound track was cleared of debris. The femoral artery could be felt pulsating in the upper wound, the rod having passed in front and to the outer side of the vessel and behind the popliteal artery, the leg being slightly bent when struck. A dressing was applied, and the patient was put to bed. All went well for six days, when, suddenly, without warning, the wound in the thigh began to bleed copiously. Being in the hospital, and near at hand, I was able to check the bleeding and apply a ligature to the bleeding point. The case then pursued a normal course for six days more, when, being in the vicinity of the ward, I heard the patient cry out. Hastening to him, found the wound bleeding again most seri-

ously. Quickly removing the dressing, and placing a thumb in the wound over the artery, I was able to control the bleeding until instruments could be procured. I then clamped the femoral artery in the lower and upper angles of the wound, and had the patient removed to the operating room. The femoral artery had been injured, erosion had taken place, and the wall had finally given away, so that there was an opening 0.5 by 1 cm. in the side of the vessel. Had not help been instantly at hand, a fatal hemorrhage must have occurred. As it was, nearly a pint of blood escaped. Nothing could be done but to ligate the artery above and below the opening, and await results, with the expectation, of course, that it would be necessary to amputate the leg.

The entire leg lived, however, and by encasing in cotton, to keep it warm, and slightly elevating it, to facilitate the return venous flow, we found that there was sufficient collateral circulation to sustain its vitality. The wounds healed slowly; the one in the thigh healed in eight months, and the wound of exit in the leg remained as a slow-healing ulcer for nearly a year. The patient walked on the leg in about three months. There was no swelling or edema of the leg of any consequence at any time. Thirteen months after the injury the wounds had entirely healed, and there is very little difference in the size of the legs, the injured one being a little smaller. No pulsation can be felt anywhere in the injured leg. It can be felt at the usual location in the right. When the blood-pressure apparatus is applied to the left leg, with the cuff above the knee, the mercury oscillates at 110 and 70; no sound is heard over the popliteal space, nor anywhere below. The cuff applied below the knee gives

the same effect. Collateral circulation is well established, and the leg approaches nearly normal function.

The femoral vein was apparently not injured, and this was, no doubt, a factor in saving the leg by favoring the return circulation. The first hemorrhage was evidently due to the giving way of a branch of the femoral artery, since the bleeding-point was easily caught and controlled by ligature. The second hemorrhags came through an opening so large in the softened wall of the artery that closure was not to be thought of.

X

End Results in Fractures

(1922)

Fractures continue to find a place in almost every medical program, with no signs of waning interest in this condition that is fraught with so much potential trouble for both patient and surgeon.

We have not yet found the best method of treating fractures, nor any method applicable to all cases, though experience with various methods of treatment is rapidly accumulating.

The aim of the surgeon is, of course, to restore the framework of the body as nearly as possible to anatomical perfection after injury or disarrangement of its parts.

To restore and maintain continuity, alignment, and normal relation of broken bones, so that normal function may proceed after a reasonable healing period, is an object the attainment of which is beset with many difficulties. To overcome these, the surgeon's resources are often taxed to the limit. While the pride of the artisan is his work stimulates the efforts of the surgeon to obtain mechanical perfection in his fracture surgery, we have found that a degree of displacement in the fragments of bones does not prevent union and good function, and that we seldom get a near approach to perfect coaptation of fragments unless we expose the bone to view and subject the fractures to instrumental adjustment; and even then perfect adjustment is most often not obtained.

The past decade has seen sentiment change from correct adjustment by the open method to the less perfect result obtainable by the external manipulation only. The degree of displacement that may be left and still give a fair anatomical and good functional result is the question we are trying to decide after employing the various methods and comparing end-results.

The X-ray has made our fracture work visible, and for a long time it was considered a reproach upon the surgeon if his fractures did not show up almost perfect restoration of the fragments. There was a period when the surgeon who did not scruple to make trouble for the other fellow pointed to the results of his treatment of fractures as shown by the skiagraph, and surgeons often went further in their efforts to get bones in perfect condition than they would have done had not their reputation been at stake.

It is not easy to explain to a patient why the fracture is not properly set, as he calls it, and in industrial accident work, where the surgeon is not of the patient's choice but is designated by the insurance companies, the patient's wrath is not easily appeased when he is shown an X-ray plate and told that he has a bad result.

The X-ray has shown us another phase of end-results. Patients come to us to be X-rayed for other conditions, and we find results of fractures showing considerable displacement; yet the part is functioning as well as if there had been no fracture. We have followed our own fractures that have been kept closed with moderate displacement, and have found our results better in many cases than in those we operated on, plated, or fixed by some other method. We find that Nature has a way of smoothing out kinks, rounding off angles, and bridging

over defects that is truly wonderful, which is beautifully exemplified in the union of fractures.

Anatomical perfection is always desirable, but normal function is of greater importance, and if the latter can be obtained only by sacrificing the former, then it is better to have a bone shortened or out of alignment with displaced fragments and a large callus than to have a stiff neighboring joint, impaired nerves, or atrophied or adherent muscles, which sometimes result from our efforts to restore the fragments accurately to their former position, to say nothing of the delayed union sometimes resulting from infection due to over-zealous efforts to get good apposition.

When Lane simplified the treatment of fractures by cutting boldly down upon them, after replacement, fastening the fragments with steel plates held by screws, the whole system of treatment was revolutionized. We had prior to this time been operating on badly-placed or ununited fractures, using various means of fixation, such as silver wire, silver plates held by silver-plated screws, kangaroo tendon, bone and ivory screws and pegs, and an occasional autogenous bone-graft cut out with a chisel after much expenditure of time and patience. But these rapidly gave way to the Lane technique and plate. It was found that the tissues in and about a fracture tolerated very well the cutting and handling incident to the open treatment, and that the steel plate was readily adopted into the family of flesh and bone. The strength of the steel plate made it ideal in holding qualities, and its low cost made it practicable to keep on hand an assortment of plates to meet the requirements of the varied types of fractures. It was demonstrated also that the ordinary wood screw answered the purpose fully as well for fixa-

tion as the silver-plated one, was more easily driven in, less liable to break, and held more firmly.

The open treatment of fractures became rapidly popular after the advent of the Lane plate and the perfection of the electric drill and saw. The readiness with which the fragments were replaced, when exposed to view and held there so firmly by the plate when properly applied, gave the surgeon opportunity to exercise manual skill in a new way in the practice of his art. When the repair had been made, the dressing applied and the X-ray turned on, the result was fascinating in the extreme, and the surgeon naturally compared this result with other cases treated by the closed method. After trying our best to reduce a fracture through the soft tissues by the aid of touch, and after obtaining normal length and alignment and reduction, as far as the unaided senses could tell us, the result was disappointing when the X-ray was turned on the completed job.

We were not surprised at our lack of success when we cut down on other fractures and found how difficult it was to get the fragments of a broken bone into position until we had removed organized clots, or soft tissue inclusions, and then, after replacement, to find how easily they were displaced by the pull of attached muscles.

Comparing the results of the two methods, it is not to be wondered at that so many surgeons adopted the open method; nor is it surprising that so many attempted to do this work without the proper degree of manual skill, knowledge of the mechanics involved, or the proper facilities. Poor results followed in some plated fractures. Infection occurred occasionally, with its attendant evils, ending in long-delayed recovery. A broken plate made it necessary to reopen the wound and replace the

plate with another, necessitating a new set of screw holes, thus impairing the vitality of the bone; while it increased danger of infection, most likely to adherent muscles to the bone and in the wound area. It was also observed that, if there was much separation of the bone surfaces of the fracture, the plate was apt to hold the ends apart and cause non-union.

The plating method was, therefore, not an unmixed blessing; and the comparison of the open and closed method of treatment was continued. It was a well-known fact that infection almost never occurred in a simple fracture that remained sealed up, and that union usually followed in from six to eight weeks, even though the fragments might not have been completely restored to their original position, and good function was obtained. The displaced fragments were cemented together by callus and new bone formation, and the fracture healed over, with an enlargement varying in size with the amount of callus thrown out; and if alignment were good, the enlargement gradually disappeared.

As we have studied our fractures under the X-ray, comparing the opened, accurately-placed, and fixed fracture with the closed, inaccurately-adjusted one, we concluded that perhaps it was not necessary to cut down on a fracture to get good results. So the question arose: What degree of displacement remaining after reasonable efforts at displacement in consistent with expectation of good anatomical and functional result? We know how impossible it is to secure accurate replacement of fragments in some fractures, and that this difficulty is real we have repeatedly demonstrated when we have cut down upon the fracture and have removed the intervening soft tissues from between the fragments. It is difficult to

explain to the patient or his friends, when they see the skiagraph of a fracture that is not in perfect condition, why the displacement is not fully corrected; for only those who have had experience in the treatment of fractures can know how difficult it is accurately to replace a fracture. Therefore, there is always a potential cause for trouble for the surgeon in fracture work, for, unfortunately, there is always someone, even in our profession, who is looking for just such opportunities to discredit the work of the other man. The responsibility of the surgeon, then, for the results obtained, or for the prospect of the end-results, becomes a problem, and I do not know that the question asked in a foregoing paragraph has been satisfactorily answered by anyone.

Some surgeons say that a displacement of one-half the diameter of the bone is permissible and consistent with good functional result. This certainly should be the minimum limit for the closed method, and could we be assured beyond all doubt that infection would not follow, I do not think we should permit that amount of displacement to go uncorrected without resorting to open reduction.

The experience of the surgeon and his facilities for operating under ideal conditions must be a part of the consideration, and he must fortify himself with a complete understanding with the patient and his friends. Nature's successful effort to unite fractures, even when in bad position, is seen in the many specimens in the medical museums and in the X-ray pictures of old fractures we have taken from time to time, which prove to us that, without shortening, angulation, or other deformity, we may expect all fractures to unite spontaneously even though coaptation is not perfect. I do not believe that

any hard-and-fast rule can be established, but that each case must be considered by itself; and in the decision we must consider the testimony from every reliable source. Knowing that the reduction is not perfect is always a disturbing thought; and one is always much better satisfied if he knows his work is as nearly mechanically perfect as he can make it.

If one wishes, however, to avoid open treatment of fractures, the weight of accumulating experience amply justifies finishing the dressing of a fracture with a moderate degree of displacement rather than resort to the open method. The laity has learned much about the treatment of fractures, and end-results have proved to them that good function does not depend wholly on anatomic perfection.

While C. H., aged 24, was working on a landing, a roll-way broke, and logs rolled over onto him. He was pinned under them for about an hour. The temperature on that day was about twenty degrees below zero. As a result of the accident, both legs were broken, and the left foot was crushed and lacerated clear across the top at the base of the toes. There was a contusion over the sacrum, and the right arm was badly bruised. He was given attention by the local doctor, who sent him to the hospital at Ashland.

After the first day he showed some shock, and general physical and mental depression; the third day he became delirious, and his temperature ran up to 103. The injured toes were becoming gangrenous; the right leg, opposite the fracture and extending up some distance above the knee on the inner side, became oedematous, and took on a dusky hue, the entire leg becoming swollen clear to the hip. It was evident that the toes had been frozen

and that the surface of the right leg had been frozen at the site before mentioned.

On January 6th, the third, fourth, and fifth toes were amputated; the gangrenous edges of the wound were removed, and the wound left open and dressed with gauze and Dakin solution. The progress of this wound was fairly satisfactory, but in the meantime the skin of the right leg, on the inner side, at and above the point of fracture, began to slough away; pus was forming in the subcutaneous and intermuscular spaces, and also around the fracture. Without any swelling to speak of, at the site of the fracture in the left leg fluctuation was detected, and on incision a considerable amount of pus escaped from around the fracture of the tibia. The patient was very septic, though the temperature began to go down as soon as the pus-pockets were opened.

The sloughing of the skin on the right leg continued, and the suppuration extended until it had reached the middle of the thigh and nearly to the ankle. The pockets were opened and drained and Dakin-Carrel tubes were placed on the bottom of the cavities, and led out to the dressing for periodical irrigation.

The fractured ends of the bones becoming displaced, it was impossible, by any means that could be applied, to hold them in place, while the handling of the legs for the purpose of dressing them was a most disagreeable undertaking. In order to enable us to handle the legs, I put on the front of each tibia a long Lane plate, which enabled us to handle the legs as well as if they had not been broken; then we were able to proceed with the treatment in quite a satisfactory manner.

A large bed-sore developed over his sacrum, which it seemed impossible to prevent, although he was put on a

Bradford frame early, and all possible precaution taken. The injury, however, at this point, together with the frosting of the tissues, made the bed-sore inevitable. His condition remains fairly satisfactory when everything is considered. There appears to be a fair prospect of his recovery.

The bone plates, of course, were placed on the bone in an open wound, and no effort was made to close the tissues over them. The plates have made no disturbance; but, on the other hand, they have made it possible to handle the legs as they could not have been in any other way. I have previously reported my experience with a Lane plate in bridging over an elbow joint that had been entirely carried away by gun-shot, making it possible to handle the arm and keep it dressed until such time as the defect was filled with soft tissue, resulting in a very useful arm. In this instance, the plate was exposed during the entire time it was in position.

My purpose in reporting this case is that it is a most unusual one,—both legs being broken, complicated by frost-bites, with sloughing of tissues and suppuration at the site of fracture.

At the height of the septic process, three days after the injury, the red count was 2,290,000 and the leucocytes 17,100. At the time of this writing the red blood count is 2,240,000 and the white count 13,600.

XI

Treatment and Results in Fractures

(1923)

The value of any surgical procedure is to be determined by the degree of success attained in the relief of the condition for which it is undertaken. The procedure to be adopted by the surgeon is left to his judgment, and the selection of the method through this judgment is to be arrived at by his own experience and a rational use of the experience of others, available through clinics and published reports.

So much is being written these days about fractures that one hesitates to propose it in a medical program without an apology; but until the profession arrives at a method of treatment giving uniformly good results in all cases, the treatment of fractures will be an open question. I, therefore, venture to bring this subject again to your attention, knowing that those whom I address are practitioners like myself, searching for the truth in the fracture question, and, having tried many methods of treatment, are not satisfied with their results in many cases.

It is not my purpose to bring out any new method nor any arbitrary changes in the methods now in use, but possibly to present some thoughts that will be helpful in making the form of treatment we now use more satisfactory.

There is uppermost in the mind of every one who at-

tempts to treat a fracture, and it has probably come to all of us many times when we have attempted to treat fractures by the closed method, this question: Have I secured an approximation of the fragments so that I can expect union within a reasonable healing period with a good functional result, and what shall I say to this patient when he is shown an X-ray picture of his broken bone with its fragments out of place?

We all know how disappointing the X-ray plate is when it pictures the broken bone in a part which bears every resemblance to normal length, alignment, and outward appearance; and that the reward for using our best efforts is to see every fracture, which has been displaced, more or less out of place, in spite of any amount of external manipulation we may have made.

It is seldom, if ever, that a displaced fracture is completely reduced unless we cut down upon it and remove the interposed tissues and clot.

Fortunately, experience has taught us that it is not necessary to have correct replacement of fragments; that good anatomical and functional results will follow the closed, moderately-displaced fracture as quickly as the one that is opened, accurately replaced, and fastened in place with some foreign body, and that Nature in time smoothes over the points and angles about such fractures. If alignment be good, there will eventually be few signs of the fracture left.

We see in the skiagraph many cases of old fractures functioning normally, though there is considerable deformity of the bone not evident from without. We also see many old fractures where callus, angles, points, and deformities can be seen and felt without the aid of the X-ray, yet function is proceeding normally.

We have, too, seen many of our fractures that we have accurately replaced by the open method remain ununited for a period much longer than it takes the simple fracture to unite if left closed, though not quite in place. Skiagraphs of our fractures operated on showing the open spaces between the fragments, persisting long after they should have ossified, annoy us often. It is reassuring to know that, in some of these, there is a callus splint that does not show in the picture, which enables the part to function until, after varying periods, the ossification is complete.

We are told that too many fractures are operated upon; but no one has yet told us what is the maximum amount of displacement we may have without resorting to the open method. Until this question can be answered quite positively, we must expect to be criticised by those who, whether or not competent to judge, will, nevertheless, pass adverse judgment on our work.

It is much more comforting to know that a fracture is completely reduced, even if we have to open up to make the reduction; and now that facilities for operating on fractures are so good, and the dangers at a minimum, there is a strong temptation to operate on them all.

For myself, should I sustain a fracture, having available the services of a good surgeon in a modern hospital, I should choose the open method rather than have the fragments very much out of place. I should want the readjustment to be three-fourth perfect, as a minimum. This conclusion is arrived at after an experience of a third of a century in the treatment of fractures in a section of the country where fractures have been common and where most all of the methods of treatment have been tried out.

I am aware that a great majority of those speaking or writing on the treatment of fractures advise against operative treatment, and especially against the use of plates and other non-absorbable material; but I maintain that there are many cases that require the Lane plate, or the Parham and Martin band, or some other strong support that should be applied to the fragments.

I am willing to admit that the indiscriminate use of these various aids to reduction and maintenance of position should not be made except where the most rigid asepsis is obtainable and by surgeons of experience in the mechanics of fracture surgery.

Attempts to popularize any new procedure always call forth enthusiastic (and often misdirected) effort to make use of it, with failure to obtain the results of its originator, and disappointment is followed by discredit for the procedure.

Few men can follow successfully the leadership of others. Few surgeons are equally successful with the originator in the use of any new method. Many promising surgical procedures, successful in the hands of their inventors, fail when tried out by strange hands. No two men will get exactly similar results with the same method, whether they be physicians or surgeons; just the one who has made success in practice in one community will not be equally successful in a new location until he adapts himself to his new environment; for communities differ as well as men.

This human element must be taken into account when passing judgment on the value of any form of treatment.

While we aim at anatomic perfection in the treatment of fractures, abundant evidence is before us that good functional results may be expected, even if there

be considerable separation of the fragments. Those of us who may have been compelled to complete the dressing of a fracture that did not look first-rate in the skiagraph may take encouragement from the many cases that come before our observation where the results are entirely satisfactory,—if we can only have the co-operation of the patient, which is not always easy to obtain. This lack of co-operation is often the greatest difficulty in restoring the function of a part.

We know that comminuted fractures make the poorest showing under the X-ray, and that correct replacement of these fragments is wellnigh impossible, due to several factors, the principal one being the attachment of muscles pulling in many directions, so that, if the fragments be brought into position, they cannot be held there without some artificial means directly applied. Callus and bone formation seem especially active in these cases, and, if not operated on, they do surprisingly well if held with the ordinary external splints.

We find an increasing readiness on the part of surgeons to display their comminuted fractures with fragments badly out of position, and call a reduction satisfactory, which, to a layman, would seem a very poor job. Results previously obtained in such cases give assurance to the surgeon, which he did not possess in the early days of the X-ray.

The beautiful exhibits of X-ray pictures of fractures, plated or treated by other means, which we formerly saw on the screen, did not tell all the story. The poor jobs were not shown. We show them all now without hesitation; for we have learned that those cases that look bad are not really so, and that Nature, if properly guided and

assisted, will do wonders in restoring a broken bone that, under the X-ray, looks almost hopeless.

Of the cases that will presently be shown on the screen, (lantern slides were here shown) I desire to call especial attention to two, illustrating a method of bridging a gap where there has been loss of bone,—one case in which the entire elbow joint had been carried away by a charge from a shotgun. A long Lane plate, bent to an angle and fastened to the humerus and ulna, was a most satisfactory means of holding the arm until healing had taken place, making it possible to handle and dress the arm, which we could not have done in any other way. Ligamentous union followed, giving a joint that is almost as useful as a normal joint.

The other case is a little boy who had a charge of small shot pass through his upper arm at short range, carrying away about two inches of the humerus, but leaving some fragments of the bone in the wound, still attached to periosteum. A Lane plate bridges this gap, enabling the arm to be handled with ease and comfort to the patient while the fragments form nuclei for the rebuilding of the bone. This is a recent case, now under treatment, and I expect a regeneration of bone that will give a useful arm, and a bone inlay can be inserted at the proper time, if it should seem necessary. This, to my mind, is the most successful use to which we have put the Lane plate, indispensable as it seems to be at times in holding broken bones in position.

The other fractures shown are chiefly of the long bones, representing the different types of simple, compound, and comminuted fractures in varying degrees of reduction, with the means of retention from the external splint to the bone inlay, including the Lane plate and the

Parham and Martin steel band. Experience proves that all these methods have their place and serve a purpose of distinct value.

The results in many of these cases prove what has been said in the foregoing paper; for they are old enough to enable one to judge of the value of the treatment. In all these cases good functional result has followed, though the period of disability has been unusually long in some of them, due to delayed union, caused by a mild infection in the open fractures and to other causes.

It will be observed in some fractures of the thigh that the plate has held the fragments apart after the preliminary softening process has taken place, so that when even slight weight has been put on the leg the plate has either bent or broken or the screws have pulled out. For this reason, the plate in a thigh bone should be removed in about four weeks. The fractured ends will be drawn together by the muscles, and, being held in alignment by a splint, union is much better favored. In one case a plated fracture of the humerus shows the plate in situ four years after being put on. It is buried in callus.

In another case, the plate is still on a femur after eight years. It is the second plate on this fracture. The first one was bent and torn loose, as before mentioned. It has not made any trouble and, at the patient's request, has been permitted to remain.

The bone-band shown on several of the fractures, especially oblique and spiral fractures, are always removed in about four weeks. Otherwise, by their annular pressure, they are apt to interfere with the nutrition of the bone and set up a mild periostitis.

End results prove to us that the fragments of a comminuted fracture, though badly placed and impossible to

replace without opening the fracture, had better be left alone after we have made as good a reduction as possible.

XII

The Surgical Treatment of Burns

(1924)

The surgical treatment of burns is governed by the same basic principles as are applied to surface wounds from other causes.

Burns differ from other wounds in that they usually involve a much larger skin surface than ordinary trauma, and treatment varies from the soothing of a reddened surface to the separation of necrotic masses of tissue, whose vitality is destroyed by the intensity of the heat, and by promoting the covering of the surface with a healthy cicatrix.

Burns of large area, even though of first or second degree, are more serious in their immediate and secondary effects than deep ones of small area, though prolonged treatment is necessary to remove the necrotic masses and promote healing of the resulting wound surface.

Burns result from a flash of flame, as in explosions; the burning of the clothing; exposure to fire or steam from which it is impossible to escape, as in wrecks; from saturation of the clothing with hot water; from contact with chemicals, or with high-tension electric wires.

Burns of the second and third degrees are nearly always infected, or at least have been exposed to the possibilities of infection from soiled clothing or dirt from various sources, and require antiseptic treatment, which

must be carried out with due regard to the great pain and the exquisite tenderness of the surfaces affected.

In first-degree burns, and in those of the second degree, when the blisters have not been broken, aseptic methods may be applied, but when the blisters are broken and the cutis vera exposed, we have an open infected wound to deal with.

The first thing to be done in a case of burn is to get the patient into an emergency room as soon as possible,—preferably in a hospital or clinic, where every facility is available for the prompt and efficient treatment of shock, relief or pain, and the treatment and dressing of wounds. Emergency rooms must be improvised in some instances, and rarely must the case be treated in the open air. Maintenance of body heat is imperative, for the shock of burns is immeasurably increased by exposure of large denuded surfaces to cold air. Clothing must be quickly removed, especially when soiled or wet. Pain is to be immediately relieved by a hypodermic of morphine, or the inhalation of an anæsthetic; and in severe burns, with the patient in great distress, this should precede the transfer of the patient or the removal of his clothing.

It is possible to estimate the severity of the burn by observing the patient's general condition. If pain is acute, the burn is most likely only superficial. If pain is slight or absent, but the nervous state exalted, pulse rapid and weak, we have a form of shock peculiar to burns, indicating a large surface involvement and a deep destruction of tissue. In the former state the prognosis is good; in the latter, grave.

There is nothing more agonizing than the pain of a burn, and nothing more merciful on the part of the medical attendant than to give at once chloroform to the anæs-

thetic stage, and follow as quickly as possible with a hypodermic of morphine. This not only relieves the pain, but also the shock to the nervous system, which is often the most serious complication.

The patient having arrived at a suitable place for treatment, the clothing is to be quickly removed, and the burned parts of the body covered with warm clothing. Care is to be taken not to rupture blisters not already broken. If the burn be an extensive one, and a bathtub is at hand, it may be filled with either normal salt or soda solution, and the patient immersed in it, when the removal of dirt and debris may proceed. With the bathtub and facilities at hand for keeping the temperature of the water at a proper degree and changed often, the very best possible results may be expected. A bathtub may be improvised, especially for children, by drawing a sheet of oilcloth or rubber sheeting over a wooden frame, thus making a trough. With this method, while constant attendance is necessary, there is no other means equal to it in controlling temperature, combatting shock, relieving pain, preventing infection, and maintaining the cutaneous transpiration. The continuous bath may be used indefinitely, and, if used, should be kept at the normal body temperature and at a proper tonicity, so that neither undue absorption nor extraction of body fluids shall occur. Provision must, of course, be made for drainage of the tub and renewal of the solution.

If the bath is not to be used, the wounds may be cleaned and dried with sterile gauze, with or without irrigation with an alkaline solution. Fluid, if applied, should be poured on in large volume, and not continued longer than necessary.

Aside from the massive irrigation, there is no better

method of removing the debris from a large wound than a strip of coarse mesh gauze held by the ends and pressed on the affected surface. It is equally applicable to a healing surface, to remove pus or wound secretion. The loosened secretion or material is pressed through the meshes of the gauze and is lifted away, leaving a clean surface.

When it is desired to apply an ointment to a large wound or ulcer, the best method is to draw a layer of gauze over the wound surface, and apply the ointment over and through the gauze. It also forms a foundation for paraffin, if it is desired to use this dressing. All have had experience in trying to spread ointment over a wet wound surface. The gauze layer obviates this difficulty, and is well worth keeping in mind.

Surgeons differ in their choice of applications to burns. Some prefer a dry aseptic dressing; some a moist antiseptic gauze; others apply a paraffin coating, either with spray or brush; some apply a paraffined mesh for a foundation and protection, and apply the healing agent outside this; some use strips of gutta-percha tissue or fenestrated sheets of this material, or the same purpose is served by a thin, perforated, celluliod film. Some use ointments, others tincture of iodine, and even tincture of iron. Most of us employ several methods.

With any of these it is possible to treat burns successfully, if we are to believe the reports in literature; and no doubt those before me have had experience with several of them, and use powder solution or ointment as the occasion requires and the facilities afford.

Whatever the method chosen for the treatment of first-degree burns, principles of wider application come into play in treating the deep ones. First-degree burns

are simple, as a rule, though with these, if the involved surface be large, serious internal complications may arise. All are familiar with the liability to pneumonia, or nephritis, with acute suppression of urine and uræmia as sequels to burns or to the petechia, which form in the stomach or duodenum, frequently resulting in ulcer and other disturbances of the digestive tube.

Sepsis, which attends the separation of large sloughs, calls for measures to render these sloughing surfaces as free from bacteria as possible; and in all cases it is necessary to preserve the absortive and secreting powers of the skin in as nearly a normal condition as possible, in order to obviate internal congestions and other disturbances. The secretory and excretory functions of the skin can be best maintained by keeping the wound surfaces clean and moist, either by frequent bathing, moist applications, or by oils that will not obstruct the pores. Normal salt solution is to be given subcutaneously to keep the body fluids properly diluted and to favor osmosis through the kidneys.

In third-degree burns, it is imperative to keep the involved surface moist with an antiseptic, to facilitate the separation of the sloughs, and, after separation, to stimulate the formation of granulation tissue. For this purpose there is nothing better than gauze saturated with boric acid solution, and if not convenient to apply the solution often enough to keep the dressings wet, the moisture may be retained by a covering of rubber sheeting, oil silk, or waxed paper.

All masses and fragments of necrotic tissue should be removed with forceps and scissors as fast as possible, as they retard healing. It is surprising to see how fast granulations develop after removal of sloughs. All

sloughing areas must heal by granulation, and if the surface is large, skin grafting will probably be needed, to hasten cicatrization and prevent contractures. If the patient is to be confined to bed, position and posture must command our attention.

Burns of the limbs or front of the body are usually easily handled, but on the back, shoulders, and buttocks, and especially on the bony prominences that come in contact with the bed, the problem is one that often taxes our ingenuity to the limit and calls for the most attentive care on the part of doctors and nurses.

The complications that arise are to be treated on sound surgical principles. The toxæmia that comes on a few hours after the receipt of a bad burn is most to be feared. The body fluids rapidly become toxic when the skin, denuded of its protective covering of cuticle, has its so-called respiratory function destroyed, and at the same time its absorptive powers increased many fold. The extra work thus thrown on the kidneys-filter, and the toxic character of the blood serum passing through the kidneys, explains the tendency to nephritis in severe burns. Therefore, to dilute these toxines as much as possible by supplying to the blood and lymph streams fluids that harmonize with them, we carry out a logical physiologic principle.

Water is, of course, the natural dilutent. It may be given by the mouth, by proctoclysis, when conditions are favorable for absorption, or normal saline solution may be given intravenously or subcutaneously. In rare instances blood transfusion may be necessary. Water should be given freely and in definite amounts during the first twenty-four hours, but food should be withheld.

After running the gauntlet of danger that attends the

healing of burns, there is another evil to be anticipated and met in a judicious way, and that is the contractures incident to scar formation. These are to be prevented by skin grafting; then, with the closing in of the grafts, and healing over, the part is kept on the stretch and the surface kept soft and elastic by hot compresses, massage, and vaseline or other oil. Much can be done in this way to prevent the contraction of scars and the deformity and resultant loss of motion and function. Passive motion may be kept up during the healing period and, even though occasional breaking up of the tissue occurs, it rapidly heals over again.

XIII

Preservation of Function After Injuries To the Feet

(1924)

The value of a paper to a group of practicing physicians and surgeons depends on its lesson being presented in such a manner as to make it readily applicable in practice when occasion arises.

I have, therefore, chosen as the subject of this short paper, the *Preservation of Function After Injuries to the Feet,* causing loss of tissue, and distortion of its members, believing that the deductions from my own experience will be helpful to my fellow-practitioners.

Among the frost-bites, cuts, lacerations, and fractures to which the foot is so often subjected, the surgeon is put to an extreme test of surgical judgment in deciding what must be removed and what may be restored to at least partial usefulness, and what measures shall be adopted to attain the desired end.

As an anatomical study, the foot is most interesting. Here is a collection of bones so shaped and arranged and held together by ligaments and interlaced with tendons as to make a structure mobile, elastic, strong, and adapted to support the weight of the body, yet capable of all movements necessary to locomotion with the grace and agility that constitutes one of the chief charms of physical movement.

The body support conveyed through the bones of the

leg at the ankle rests upon the keystone of an arch so that the points of contact of the foot with the ground are some distance from the center of gravity of the leg. Therefore, the body rests on an elliptic spring, with the convex side upward, thus taking up the jar so distinctly felt when one tries to walk on his heels, or on stilts, and which is so noticeable in the stubby gait of the flat-footed person.

On the study of the foot, we find that the arch is not anterio-posterior alone; but an arch in all directions, forming a cone of irregular outline, with its concavity directed for the most part downward and inward, thus adding to the cushion effect of the body support. It is found that the weight is applied, not at the middle of the anterio-posterior diameter of the foot, but back of the middle,—a provision of nature which gives spring and mobility to the foot that it could not otherwise have.

The foot rests on a triangular buttress, with the heel as the apex, and the ball of the foot forming the base. The outer side of the foot bears very little weight, while the inner side does not touch the ground surface while standing. The weight is borne on the heel and the ball of the great toe and, to a lesser degree, the ball of the other toes.

The toes have little weight to bear, and their chief function is to increase the spring of the foot in walking, unless they are developed beyond the intention of nature, as in toe-dancing.

If any part of the foot is to be sacrificed, it is the toes that will be missed the least, and in the repair of injuries of the foot every effort should be made to preserve the bearing surfaces, if possible, without regard to flap covering of the exposed ends. The loss of the heel is more

easily corrected by prosthesis than is the ball of the foot. Amputation through the metatarsals destroys the front bearing, so that it cannot be restored by any means that may be applied. The full length of the first metatarsal is of more importance than are all the others, though loss of any of them cripples the foot by lessening the area of the bearing surface. Loss of either front or rear bearing surface throws the foot out of alignment with the leg and disturbs the normal gait. A foot in which the arch is obliterated and has lost its spring is little better than a peg, except for a broader bearing surface, and the gait of the person who has sustained such loss is so characteristic that the defect is apparent when the gait is observed. Study of skiagraphs of the normal foot will serve to illustrate the points I have endeavored to bring out.

There is a great temptation to cover every amputation stump with a flap. Experience teaches us that this is not necessary, and lay opinion, which it might be feared would not approve of what would appear to be incomplete surgery, is easily influenced by an explanation of what we are trying to accomplish. A stump, smooth, well-rounded, and healed by primary union, may bespeak good surgical technique, but the functional result may be most unsatisfactory. Such a stump may get the patient out of the hospital in a short time; but he may spend the rest of his days trying to get some sort of a shoe fitted to his foot that will enable him to walk on it comfortably.

A few months', or even weeks', treatment of an open stump may make the same stump useful and comfortable. If a bearing surface can be preserved by the method requiring the longer time, then it is far better surgery to remove what must be removed by reason of destroyed

blood supply, using such sutures as may be applied without undue compression or tension on the flaps, and then wait for healing by granulation.

During the extreme cold of last January, a man froze both feet so that all his toes became gangrenous. The line of demarcation was allowed to form, the tissues at that point to become adherent, and the channels of possible infection to become sealed. This line corresponded to the metatarso-phalangeal joint, and, when separation was well under way, the toes were removed. No sutures were used; the articular surfaces of the metatarsals lay at the edges of the soft tissues. Warm, moist antiseptic dressings were used, and granulation progressed slowly, until the ends were entirely covered. Granulations had sprung up and covered the articular ends, except in a few places, where a thin shell of bone was exfoliated; and, though it took seven months to heal over these stumps, the ball of the foot was preserved, and the man now walks almost as well as heretofore.

Had I amputated, in order to get flaps to cover the stumps, the foot would have been shortened, thrown out of relation with the leg, the tendons would have been released at their distal ends, and a decided crippling would have resulted.

Keeping a gangrenous member antiseptic, promoting dry instead of moist gangrene, favors the agglutination of all the soft tissues, including the tendons at the line of demarcation, and there is no retraction that would disorder the relation of the muscles requiring many months for their retraining. We may thus avoid the infection of tendon sheaths, which is the complication most to be feared. Foot injuries, when the soft parts are intact, should be X-rayed for fractures; sprains and displace-

ments be recognized and replaced, if possible, for the tarsals, or metatarsals, if even slightly out of place, leave a crippling effect that is generally permanent.

It is found, also, that a bone, with the exposed end covered by articular cartilage, does much better than the raw end of a bone that has been divided by saw or bone-cutting forceps.

The points, therefore, are: to save all tissues not devitalized that still have a blood supply. Shape the stump as well as possible, without destroying a bearing surface. Do not remove the articular cartilage. Use sutures, with care not unduly to stretch or constrict tissues. If sloughing is unavoidable, as in frost-bite, make it a dry gangrene, if possible, and be in no hurry to remove the dead tissues. Promote granulation with warm, moist antiseptic dressings and, later, skin-graft, if necessary to cover the end of the stump. In this work Nature will do much to preserve function, if she is aided and given time.

It is difficult to replace broken and displaced bones in the foot; but our efforts should be directed to maintaining the arch of the foot and the proper relation of the bearing surfaces, even resorting to tenotomy when necessary to attain our object.

It is almost always best to cut the tendo Achilles in fracture of the os calcis, otherwise the upward pull of this tendon will flatten out the heel and produce a form of flat-foot that is a bad deformity,—very difficult to treat satisfactorily.

Restoration and preservation of the normal arch of the foot, when once deranged, is one of the most important and difficult measures in surgical practice and, therefore, should have our most studious care.

CONCLUSION

The principal point I wish to emphasize in my paper is to preserve the bearing points of the foot, even if to do so means an open wound and a long healing process. Do not amputate for the sake of getting flaps to cover the stump in injuries, or in gangrene from frost-bite or other causes.

There is a tendency on the part of the surgeon to want to get rid of dead tissue when an extremity is gangrenous, but it is unwise to remove the dead parts until the line of demarcation is well formed. Leave it to Nature; because, while the separation is going on, the tissues on the living side of the line are becoming agglutinated, and tendon-sheaths, lymphatics, and other structures are becoming adherent; channels of infection are being sealed, and infection, when operation is finally done, is much less liable to occur.

Another point I mentioned in the paper, and I wish to stress it here, is to leave bones covered with articular cartilage whenever it is possible to do so in amputating through a joint. Whenever a bone is present in the wound covered with articular cartilage, don't be in any hurry about removing it. Nature will take care of it. It is surprising how granulations will spring up over articular cartilage, and stumps heal in this way, giving much more satisfactory results than when we attempt to do a neat mechanical job in the beginning, at the sacrifice of essential bone structure.

XIV

Group Practice

(1927)

The medical group has come to stay. Group medicine is one of the results of the adjustment of modern science to the needs of modern civilization.

Medical service, for the most part, is an emergency call. Ill health is not expected nor planned for by mankind. The medical service group is a house of refuge, a resort for the ills that come unheralded and unwelcome and cannot go unheeded. Never in the history of the world has the human body and its functions been so well understood as now, and never has so much effort been expended in keeping people well and in avoiding accidents, as today. That we have not reached perfection, but are still far from it, all thoughtful people recognize. Specialization is accepted as the need of the age, but effective liaison with other and allied activities must be maintained.

The medical group is the workshop where the essentials of organization are mobilized, so as to give the best possible service in the interruptions of the normal processes of life in its varied and increasing activities. Conservation of life and function, with the relief of suffering, forms the basis of medical practice, and whatever means are employed the superstructure of practice must be reared on this foundation.

The doctor's office is for the most part a repair shop.

He must work on broken or worn material, and, as the expert workman does his best work in a shop properly equipped with the facilities the inventive genius of his craft has provided, so does the doctor aim to have all the resources of his profession at hand for immediate use.

The traveling clock-tinker of a half-century ago as compared with the expert watchmaker today is a fair comparison of the doctor who attempts to practice as was done fifty years ago with the doctor of today who works in the clinic or hospital with all the facilities of modern medicine and surgery at hand.

To be sure, many patients must be treated where they are found, and the resourcefulness of some practitioners in giving such service, inspires our sincerest admiration; but the doctor who is keeping abreast of the times must have the facilities of the group for the best work.

The field of medical science is so broad that no one mind can encompass it; therefore, the practitioner who attempts to do so must necessarily only touch the high spots, and must leave many essentials unseen and undone. He must have the aid of the specialist, or he is not giving the service to which his patients are entitled.

There are some essential specialties the work of which is so delicate, and requires such technical skill, that one, to become proficient, must have long and careful intensive training, with a large amount of clinical material, and then a sufficient clientele, to keep trained to the highest state of efficiency. Such, in brief, are eye, ear, nose, and throat work; urology, with the use of the cystoscope, and bronchoscopy, which technical procedures none but those specially trained can do or should attempt. Other specialties less technical perhaps, but nevertheless, re-

quiring special skill and training are: chest diseases; gastro-intestinal analysis; cardio-vascular and renal diseases; the use of the X-ray and interpretation of what it reveals; nervous and mental diseases. One cannot hope for greater proficiency in any of these without devoting all, at any rate, the major part, of his life to them.

Therefore, the group of clinic embracing as many as possible of these specialties is the ideal way to practice the healing art. Like all things ideal, the group method is not easy to practice. It is not easy to transfer patients from one doctor to another; for there are people who want their own doctor, no matter what the ailment is.

As the group system is comparatively new, a perfect plan has not yet been evolved, though numerous groups have been formed throughout the country, and are functioning in a more-or-less practical way. They vary, from the highly-organized technical clinic, with its departments segregated yet co-operating, to the so-called group of doctors who are supposed to be co-ordinate, but are in reality physicians and surgeons practicing with nothing in common except the waiting-room. The group that will best serve the average community will be found somewhere between these two extremes. One such group, with which I am familiar, is composed of men who all do some general practice. One specializes in surgery, two in internal medicine; one in urology and X-ray; one in eye, ear, nose, and throat; one in dentistry, and there is a consultant in cardio-vascular and renal diseases. There is an X-ray technician; and he also supervises the physio-therapy department, which is equipped for various forms of electrical treatment and massage. There is a diagnostic laboratory, with a full-time technician, and a graduate nurse to assist wherever needed. The business

office is equipped with a telephone switchboard connected with all the departments, an operating-room is ready at all times to receive emergency cases, and all is housed in a building built especially for the purpose. Such a system gives the small city, with good hospital facilities, a high class medical service.

The problem of mobilizing the medical service of a community into a single unit is difficult if not impossible, and it generally resolves itself into getting together a group of practitioners who can co-operate. The time may come when there will be greater unanimity in the medical profession than there now is, or has been; but there is no prospect that the whole profession will subscribe to a common set of ideals or methods of procedure. Probably it is not essential that they do, since competition in any service, as a rule, works to the advantage of those served.

It has been said that, to get the best medical service, one must be very rich or very poor. A famous surgeon when stricken by disease begged his associates to give him as good service as they did their charity patients. This man was in a large hospital, where teaching was done, and the poor were receiving the best, since they were under the closest observation by professor and student. That is a universal condition today. The rich can command what they want; the poor have it given to them; those of the middle class, of moderate means, know what they need, yet cannot afford it.

To the credit of the medical profession itself, I feel that I can truthfully say that no one need suffer for want of medical service. The doctor who will turn down a fellow-being suffering for the need of his services is so rare that we do not admit his existence. The doctor is more

often imposed upon than the patient, and in the category of all expenses, his bill is the last paid.

Aside from the services of the doctor, being laid up with sickness is an expensive matter. The provisions of modern science for the treatment of disease, while becoming more efficient, have at the same time become more elaborate and more expensive.

Hospital expenses are a great burden to the so-called middle classes, and the nurses, in their effort to dignify their profession, are beyond the reach of people of small means. Modern nursing is becoming a scholastic attainment rather than bedside efficiency. These conditions call for a remedy; but so far no one has a practical solution to offer.

The medical group is an expression of the ideals of the medical profession, in placing at the service of the people a concentration of facilities for the investigation of disease, the treatment of chronic conditions, and for prompt relief in emergencies. It is keeping abreast of the times, and is in the vanguard of the march of science toward the goal of longer life and freedom from suffering.

XV

Social Service

(1927)

Every man and woman has a place in the world, and the most important thing in life is to find it. In that place, he or she will be most likely to succeed; out of it indifferent success or failure is likely to result. Of the people who make a success in life, there are very few who do so in a vocation they do not like or for which they are not fitted. Inclination is one thing; the ability to fit in is another. Many people are deceived by a desire to do things for which they are not fitted, try to do things they are not qualified to do, and to not discover it until too late to make a readjustment. They are the misfits, forced into the current of human activities, to be jostled about by forces they cannot control.

It is said that the world owes everyone a living. This is true, but there is more than that. There is for everyone, somewhere, opportunity to earn a living for himself and those dependent upon him, and a competency besides, so that he and his may enjoy some of the luxuries as well as the necessities of existence, and provide for an unproductive period, which, sooner or later, comes to almost everyone.

In the scheme of things, growing out of our complicated and intricate relationships in this busy and rapidly-changing world, the selection or the placement of men and women in vocations often miscarries, and necessity

in the struggle for place, power, name, or the mere struggle for existence, produces the flotsam and jetsam of humanity, to which the State and various organizations formed for social uplift must devote much serious attention.

Evils, real and imaginary, are swaying the current of human thought. Where they will lead civilization to is a matter of serious concern. The unequal distribution of wealth, and the means of acquiring it, comprise perhaps the greatest cause of discontent now abroad in the world. And the apparently growing tendency to estimate men in terms of their financial rating is tending rapidly toward the breaking down of our social systems.

Our nation was founded on the principle that all men are equally entitled to life, liberty, and happiness,—if it can be found; and, proceeding on this principle, we have grown to be the greatest nation on earth. Whether or not we can keep it at the head of the march of nations depends on how we deal with the intricate relationships that have come with our growth, development, and efforts to make this the melting-pot of nationalities; fusing them into a new and distinct civilization. It is a tremendous undertaking, and calls for the wisest counsel and guidance.

To read history, or to look back over the period of a lifetime, one is impressed with the wondrous speed we have traveled, and the distance traversed in human progress. The achievements of science during the past fifty years, projected backward a century, would read like a fairy tale, impossible of realization.

The progress of human relations has not been so beneficent; the hospitals, the penal institutions, and the masses struggling for existence admonish us that we are con-

fronted with a most serious problem; that too large a proportion of our population is employed in controlling, protecting, or forcibly directing the activities of a rapidly-increasing minority. The forces of society leading to the enjoyment of life, liberty, and the pursuit of happiness cannot be allowed to go on without direction.

It is, I take it, that thought along the lines suggested has brought into existence an organized effort on the part of those who would correct existing evils, to improve the social conditions of the strata of society that cannot or will not, without help, function in accordance with modern ideals.

A subject so broad and deep cannot be covered in a short paper, so it will be necessary for me to confine myself to one phase of this many-sided question, and consider alone the social aspects of physical examination of employees. No one should be employed in any occupation for which he is physically unfit; nor should anyone be expected to employ any person with an obvious or concealed disability that will render that person liable to injury or increase of disability. Such defects, when known to exist, should be considered in placing the individual in service such as he is best fitted for and is as free as possible from hazard.

It has long been my contention that everyone should be subjected to a physical examination before being employed in any occupation. This is in justice to both employer and employee, that both may receive the best returns from the service.

It is not just to the employer that he be held responsible for the increase of a pre-existing disability, nor for an injury to which the employee is made liable by some physical defect. It is noticeable that foremen and di-

rectors of labor do not always take into consideration a man's physical fitness for the work he is expected to do. Needless loss of time results. No workman can afford to be laid up, even for a compensable injury; and everything possible should be done to prevent it. A man with weak inguinal rings should not be placed where he will have to do heavy lifting, neither should one who has spinal curvature. A man with a lame foot should not have to move quickly over rough surfaces. A disabled hand can make one liable to injury; defective sight, or hearing, or slow muscular co-ordination, would jeopardize a man in many occupations. Any thus unfit, and many other defectives, could be employed where there would be little or no hazard.

The subject of hernia, which has caused the Industrial Commission, the insurance companies, and the employer of labor so much embarrassment, could be more fairly adjusted if a man's liability to this disability were known when he was employed.

It is an injustice to the employer that he should be compelled to pay compensation for a disability that was dormant at the time the man was employed, unless the employer knew of its existence and accepted the risk knowingly.

Looking at the ethical side of the question, it may be justly held that every man is entitled to employment at some gainful occupation, and social service, when properly administered, will see to it that all who need work will get it, but that in providing it the employer will not be accepting undue responsibility.

One thing of great value that has come with medical progress is the agitation for periodical examinations, in order that danger signals of disease may be recognized

in time to avert the consequences. Some employers of labor (the railroads are a notable example) are requiring initial examination of their employees, and re-examination at intervals when defects are known to exist. When this practice becomes universal, many of the problems that are perplexing the Industrial Commission will have been solved.

The compensation law in Wisconsin has been a great boon to laboring men, and doubtless to employers of labor as well; although it is much abused, and has lengthened the period of disability in most all injuries. The termination of the period of disability is always a debatable question, and depends on many factors familiar to the commission and to the industrial surgeon. If a man wants to work, he will do so with even a considerable handicap; and if he does not want to return to work, he can easily find reason for not doing so. Perhaps the social worker can help in this dilemna.

Just now there is much discussion as to when men should retire by reason of age, and it is probably that the final conclusion will be that any man, while physically and mentally fit and able to do his work well, should continue, whether he be fifty or seventy; and no man should be retired from active work by reason of age alone when it is proved by examinations that no physical or mental disability exists.

This paper is intended to be suggestive of thought along some of the lines of the many-sided subject of social service, which has great possibilities for the betterment of the whole human family,—when properly planned and wisely administered.

XVI

Cancer

(1928)

The campaign against cancer has been pushed vigorously during recent years. I have had occasion to speak to various organizations on the subject, and the following paper is an abstract of what was said:

Too many persons are victims of cancer, and too many lives are needlessly lost because such persons have too long neglected the danger-signals of disease. Too many are operated on for cancer without success. These are among the cases that come to the surgeon too late for successful operation. It is a disturbing fact that cancer appears to be on the increase.

It is one of the heartbreaking experiences in the life of the conscientious surgeon to be called upon to give the patient that forlorn chance, which comes from doing a desperate operation for the removal of advanced cancer, and to feel that some time in his efforts he may have shortened rather than prolonged life; and while he may feel a certain satisfaction in having extended the span of life for a few more months, or possibly years, he knows most surely that the disease will return in nearly all, if not all, advanced cases.

If it should be said of us that we are urging people to operation for the removal of certain kinds of tumor formation, we will admit it; but we claim that we are actuated only by the best interests of those who consult

us, and with a full realization that if operation is done early, it is comparatively simple. Many growths can be removed under local anæsthesia, with little suffering or discomfort, and with a prospect of recurrence almost nil. Those of us who have done surgery for the past thirty years or more can look back at many lives needlessly sacrificed to this disease, when a simple, timely operation would have been successful, and a formidable and ineffective one avoided. Therefore, in that spirit of altruism that ever actuates the surgeon in his efforts to mitigate suffering and prolong life, we are urging that attention be given to every appearance of growth where it does not belong, and that competent medical advice be sought early.

There is only one reliable cure for cancer: that is, early removal by clean incision. The fantastic stories told by various cults of cures of cancer are false and misleading. Such cases are probably not cancer, but some form of benign growth. The one who discovers the cause of and a cure for cancer will have conferred on mankind the greatest of all blessings, and will have immortalized his own name.

To attempt to cure cancer by any form of manual treatment is useless, if not criminal. Rubbing and handling a malignant growth can only hasten migration of its cells and thereby spread the fatal element beyond our power to overtake or arrest it. The late treatment of cancer may be likened to a growth of weeds, which proceed from a simple plant; when the seeds produced by this plant are released and sent broadcast it is impossible to prevent the germination and growth of all the seeds that have been released. When the cells of a malignant growth break through the limiting membrane, they scat-

ter rapidly in all directions through blood and lymph-streams, and the removal of the central focus does not hinder in the least the further progress and growth of its progeny.

To treat cancer by any form of mental healing does not influence its growth, and only delays what could be timely and successful removal. There is but one method of diagnosing cancer beyond doubt, and that is by section and the examination of the tissues under the microscope.

To call every tumor a cancer, as is done by some who prey on the credulity of the people, is wrong and misleading. A tumor may be a cancer, therefore should be removed. If left, it may be atrophied and go away, or remain as a harmless growth within the tissues; but to leave any abnormal growth is taking chances that are unjustified and is inviting all the evils incident to the dread disease cancer. If a tumor disappeared of its own accord, it most certainly was not a cancer. Most of the tissues of the body are liable to malignant growth. If a tumor begins to grow in connective tissue, it is called sarcoma. If it has its origin in epithelial tissue, it is carcinoma; and this is the variety that is later known as *cancer*. Sarcoma may invade the connective tissue of any part of the body; but is more likely to be found in some locations than in others.

Properly speaking a carcinoma is not a cancer until it is open and begins to destroy and eat away the tissues, as its name indicates. It is customary, however, to call all malignant growths *cancer,* and there is no objection in a general way to their being listed under this common head. The studies and investigation of medical science have discovered the causes of most all diseases; and to know their cause, the treatment and means of prevention

naturally follow. A brief mention will suffice to remind us that typhoid, scarlet fever, plague, diphtheria, and other diseases have been robbed of their terror by the discovery of their causes, which discovery has led us to their prevention and cure. We have learned that diseases are transmitted from one person to another, and that they are communicated by contact, or through a medium such as air, water, food, or clothing. Other diseases are inherent within the body and develop under the influence of some stimulant when conditions are favorable for their growth and development. Such a disease is *cancer*. If there is a germ of cancer, it has not yet been discovered, and the cause of this malignant growth is for science of the future to discover.

We know that the human body is subject to various kinds of normal growth,—overgrowth of some of the body tissues beyond the normal limit. Some of these growths merely push aside the tissues in their immediate vicinity, and rarely cause pain or disturbance except when large, causing pressure. They have no tendency to destroy life. These are benign tumors, not cancer. Other varieties of tumor, apparently beginning in the same way as the benign, extend their growth into every structure with which they come into contact. At first painless, they later cause pain and disturbance of function, and rapidly exhaust the vitality of the body, and finally destroy life. These are the malignant tumors to which the term *cancer* is applied.

Malignant tumors grow not only by direct extension of themselves into the tissues with which they come in contact, but they migrate into lymph and blood streams and are carried over wide areas and to different parts of the body. This accounts for the so-called metastatic ex-

tension of cancer, and these secondary growths are due to colonies of cells that grow in the location where the traveling cells have been arrested. The popular idea that a cancer has roots is wrong. The supposed roots are merely the offshoots of the growth, and are limbs, not roots; and when these are formed, the cells of the growth, like the fallen leaves of the tree, have been scattered over a wide area and cannot be collected or recalled.

The human organism begins in a single cell 1/120 of an inch in diameter, too small to be seen by the naked eye. This cell divides again and again into such numbers and with such rapidity that the individual cells become as numberless as the sands of the seashore. As these cells multiply in embryonic life, they take on special characteristics, arranging themselves in groups within their limiting membrane or capsule, and, in obedience to a definite law of Nature, become the organs of special function. Thus the body develops into one organism, until the human machine is complete in all its parts, each part with a definite work to perform. During the period of embryonic growth, it is believed that certain groups of cells are set aside and not used in the structure of tissue, and, though located in organs of special function, they retain their embryonic type; and, when, in later life, they take on growth in response to some stimulus, they grow with great rapidity and, retaining their embryonic type, know no law except that of growth. This is Conheim's theory of tumor formation; and no more plausible theory has yet been advanced.

Since study and investigation of cancer are absorbing much of the attention of the scientific world, it is hoped that its cause will be discovered and this arch enemy of

the human race be obliterated. Until such time, there seems to be one course to pursue, and that is to remove every abnormal growth by clean incision, or by destruction with electric cauterization, as soon as it is discovered.

XVII

Surgery

(1928)

Surgery is of two kinds, emergency, and elective. The former is apt to find us unprepared, since accidents are not expected; they happen under circumstances that do not admit of the refinements of preparation. All kinds of dirt is ground into wounds or thrust into the tissues by invading objects. Shock and bleeding may occur; removal from the location of the accident and transportation to the hospital may be difficult and exhausting. Such patients are poor subjects for operation. Experience shows that strong healthy persons prostrated by injury or disease react poorly, while, with due preparation, very grave and extensive operations may be done with little shock to the organism and are followed by recovery. A certain immunity to surgical shock is acquired by prolonged illness, but there are limitations here that must be realized.

Assuming that it is the unexpected that nearly always happens, the duty devolves upon the surgeon to make due provision for the care of every case, whatever the nature of the injury.

Adequate means for hospitalization of injured patients must be provided, and this means proper stretcher, ambulance, and attendants who know how to handle an injured person without increasing the injury or shock. The modern hospital is prepared to do the rest, and some

clinics are equipped to take care of all but the major cases.

Elective surgery is the most satisfactory. The patient can have time for preparation and for an exhaustive inquiry into the cause and progress of the disorder. The various organs and functions are tested out, and he or she goes to the operating-room in the best possible condition.

One element of success in some medical centers is that patients usually go voluntarily and are able to travel some distance, so they are not shocked and acutely debilitated, and make much better surgical risk. It has been said that surgeons are of three general classes:

1. The general practitioner, who operates occasionally in emergency, and, in order to be prepared to do this, he keeps at hand an operating equipment more or less adequate; he operates when he must, but, being a conscientious man, he realizes that the best interests of his patient demand that he seek the assistance of men with larger experience in certain special lines, who have hospital and other facilities for doing surgery in accord with the best principles of the time.

Many of these men do brilliant work sometimes, but, owing to the handicaps that are obvious, must occasionally fall down in diagnosis and treatment. Such a surgeon is the ideal country practitioner. He must be prepared at all times to treat whatever comes to him or to which he is called. He develops self-reliance and confidence, but, by frequent contact with other practitioners, learns his limitations and does not allow his self-esteem to keep him from calling for help when his patient's need suggests it. He is "the doctor of the old school," the ideal of which is becoming rare. Doctors are machine-

made nowadays, and the commercial spirit permeates the profession to an extent that is not to the best interests of the medical profession of the future. There are still, however, a few noble souls carrying on their whole life-work in out-of-the-way places, ministering to the sick among a people of whom they become a part, sharing in the solution of their community problems, and at the same time keeping in touch with the leading thought of their profession.

It is a pleasure and an inspiration to have known and to know many such practitioners of medicine, real men, even in obscurity. The infrequent operator may be a menace to the community he serves, when, for the sake of the fee, he undertakes work he knows he is not qualified to do or takes his patient to a distant hospital where he cannot follow up the treatment he has started. He is also a menace when he refers his surgical cases to an incompetent surgeon who will split the fee with him.

2. The second class is the general practitioner who, after an experience of several years in general practice with a fair proportion of surgery, limits himself to general surgery and prepares himself by frequent visits to clinics and by association with surgeons personally and through surgical societies.

He generally succeeds from the first class to this second by reason of his desire to specialize in a field most agreeable to him, and, being located where there is an adequate amount of surgery to give him experience, he has the opportunity to cultivate that judgment and skill so necessary to meet every emergency that arises, which can only come with experience. He is the consultant of his colleagues, with whom he has established friendly and helpful relations. He appreciates the difficulties that his

brother general practitioners have to meet and knows their problems, for he has passed through it all himself. He regards his patient as a fellow human being who is helpless, who has placed himself trustingly in the hands of one in whom he has confidence, and who knows he will get the best service that can be given him. This surgeon is conscious of the frailties of human nature, and is kind and sympathetic toward his less fortunate brother. He surrounds himself with such assistance as is necessary to render service in accord with modern scientific principles, and this includes the facilities of a well-equipped modern hospital.

He does not split fees with doctors who refer their cases to him; but, conscious at all times of the financial problem of his colleague, gives assistance so far as possible to the referring doctor in securing adequate compensation for his services,—all within the knowledge of the patient. Fee-splitting proved to be a curse to the profession; and one of the primary objects of the College of Surgeons was to eradicate this evil.

There is something to be said in favor of the surgeon's seeing that the doctor who brings the patient to him receives proper remuneration, for we know that the home doctor is sometimes treated shabbily by the patient, or by his family; and it is a part of the surgeon's duty to impress upon the patient that the doctor who diagnoses the case and gets the patient to the surgeon in time for a successful operation is entitled to an adequate fee. There ought to be some kind of premium put upon the early and correct diagnosis and the obtaining of early treatment, whether it be medical or surgical; and a corresponding penalizing of oversight or neglect of serious conditions until it is too late. Too often do we find patients too late

for treatment, which fails, when life would have been saved had the operation been done earlier.

3. The third class comprises the young, highly-trained, technically-skilled man whose surgical background is the medical school, the laboratory, and the hospital, with perhaps an assistance-ship to some surgeon of large practice. He is apt to consider only the scientific aspect of the case and to disregard the human side, and to look at the patient through the eye of the laboratory rather than estimate him through the medium of experience.

His deductions are made from statistics, and everyone knows that surgical judgment comes from personal experience, and not from the records of someone else. He views every case from a surgical standpoint, and operates on every patient when there is the slightest reason for doing so. He ignores the medical, dietary, and the other considerations, which play so important a part in the cause of disease and in disordered function. He is apt to consider the human body as so much living tissue for him to handle and see how far he can go within the limits of safety. It is fortunate that the human body will stand a great amount of abuse and recuperate itself, else there would be much less surgical operating today.

The scientist of this class is inclined to be self-centered, and will disregard the other fellow. His ethical training has been neglected in the process of cramming his mind with scientific facts. He may have little regard for the feelings or interests of his fellow-practitioners, and may be either a gentleman or a boor, depending on his educational background and his ultimate aim. He aims to get his patients first hand, and not depend on referred work. He cultivates the public, not his profession.

Effort has been made to depict both sides of the char-

acter of the young, ultra-scientific surgeon. I may have been a little severe, but I think I can truthfully say that he is apt to run to the darker side of the picture.

Medical education cannot be obtained within four walls. There must be extensive human contact in order to develop those qualities that go to make up the real doctor of today. The desire to succeed in one's chosen vocation, to be of service to our fellows and to society, to be conscientious in dealing with those who place themselves in our hands, and to fulfill our mission in accord with the highest ideals of a Christian civilization will produce real men in the practice of medicine and surgery, but the ambition for place, for the acquisition of money, and the desire for popular acclaim, pushing aside ruthlessly all who stand in our way, are considerations that spoil the picture.

It has always been my aim to qualify as a surgeon in the second group, building a surgical practice of a foundation of general practice, and to avail myself of association with the leaders of the profession, in clinics and medical societies, where I have sat at the feet of most of the leading medical and surgical teachers of my day. I have enjoyed the acquaintance and friendship of many of them, and have obtained their point of view. I have gathered inspiration from many fields, and have made use of such opportunities as came my way in an isolated locality, remote from the teaching centers. I have tried to be both a "doctor of the old school" and an up-to-date surgeon.

How far I have succeeded is not for me to decide. Like everyone who strives to attain an ideal in a materialistic environment, there have been times when I have soared above the clouds in the clear and radiant

sunshine and times when I have been precipitated into the darkest valleys of disappointment. For the most part my position has been on the mountain-top, viewing yet seldom reaching the vistas spread out before me; lonely much of the time, because those about me failed to see the vision that enchanted me; anxious at all times to serve my fellows and to cultivate the generous impulses actuated by a feeling of common brotherhood; misunderstood often,—for one cannot stop to explain his every move. Possibly I have been over-estimated at times. I have been carried aloft among the stars by the gratitude of those I have helped, and have been given a glimpse of the inferno of ingratitude by others, who failed to appreciate what was done for them. I have made many friends, both in and out of my profession; and as I look back over the span of sixty years, these friendships are my richest possession, and what success I have made in my profession has been due in no small measure to their loyalty and helpfulness. Were it possible to live these years again, I should be a surgeon,—but a much better one.

INDEX

A. P. A. movement, 91
Abscess, *See* Pus
Accidents, 94, 95, 96
Advertising, 24
Aeroplane, 102, 113, 114
Agriculture, 122, 123
Allegheny Mountains, 12
Ambulances, 89
American College of Surgeons, 131, 162 *et seq.*
American Hospital Aid Association, 80
American Legion, 142
American Medical Association, 76, 83, 84
Amputation, 83, 223 *et seq.*
Amusements, boyhood, 21 *et seq.*
Anæsthesia, 206, 254 *et seq.*
Andrus, Dr. Adellon P., 121, 130, 140, 154, 155
Antisepsis, 77, 78, 172 *et seq.* *See also* Surgery
Antwerp, 150
Apostle Islands, 94
Appendicitis, 82, 94, 100, 200. *See also* Surgery
Appert, Dr., 172
Architecture, 67-72
Army Aviation Corps, 113
Asepsis, 206
Ashland, Wis., 80, 81, 85, 101-102, 106, 113, 119 *et seq.*, 127-313 *passim*
Ashland Daily Press, 156-157
Ashland General Hospital, 92 *et seq.*, 144, 267
Ashland Medical Society, 83
Ashland Training School for Nurses, 87, 88
Ashland Water Company, 157
Ashum, Dr., 80
Augustana Hospital, Chicago, 154
Automobile, 107-114
Axley, Dr., 105

Babies, 96, 97
Bacteria, 77, 83, 169-191. *See also* Germs
Baker, Judge, D. A., 156
Baldwin, Captain, 113
Bank-barn, 27, 28
Bar-lead, 27
Bardon, Thomas, 160
Barkley, "Jack," 157
Bats, 70
Bayfield, Wis., 103, 104
Beaser, Martin, 157
Beds, 40
Beebe, E. P., 130
Beef, 26
Bees, 37
Belgium, 50, 51, 115, 146, 147, 148, 149, 150
Belleau Wood, 150
Bicycle, 106, 107
Biology, 169
Birth, 176
Blacksmith shop, 59, 60
Bleile, Dr., A. M., 74
Blood Pressure, 78
Bobb, T. N., 129
Bottomley, Dr., 236

Bowdoin College, 156
Boyhood, 31-37
Braddock, 53
Bradford frame, 269
Brain surgery, 82, 83. *See also* Surgery
Brennan, F. D., 140
Bridges, pioneer, 20-23
Bro, A. C., 129
Brownell, J. D., DD., 128, 130
Brownstone, 120
Brussels, 150
Bunker Hill, 153
Burns, 116; surgical treatment of, 278-283
Butter, 26

C. H., The case of, 267-269
C. M. T. C., 152
Cæsarean section, 89, 105. *See also* Confinement, Child-bearing
Calico, 27
Camp Custer, 140
Cancer, 301, 302, 303 *et seq.*
Candles, 24, 27
Carcinoma, 303. *See* Cancer
Carolina poplars, 119
Carpentry, 66, 67, 68-72
Catholics, 91
Cells, 176 *et seq.*, 305-306
Cheat River, 69
Chateau Thierry, 150
Cheese, 26
Chicago, 120
Chicago Northwestern Railway, 153, 216
Chicamauga, 87
Child-bearing, 203 *et seq.* *See also* Confinement
Cigars, 28
Civil War, 11, 12, 71, 75, 114, 157
Clap-boards, 56
Clark, C. F., 74
"Clinic, The," 125, 141, 144
Coal, 20, 21, 22, 120-121
Cocci, 177
Coffee, 25
Cold-storage, 25, 27, 28
College of Surgeons, 310
Collins, A. W., 129
Collins, Miss Mary, 129
Columbia, 101
Columbus Medical College, 76
Confinements, 103-105. *See also* Child-bearing
Continent, The, 146 *et seq.*
Control of Disease, 191. *See also* Bacteria
Corn-husking, 44
Corpuscles, 19
Cross, W. M., 129
Crownhart, George, 84
Culver, Paul, 113
Cumberland Trail, 53
Curtiss Aviation School, 113
Cutler, Catherine, 130
Cysts, ovarian, 202 *et seq.*

Daily Press, 113
Dairying, 26 *et seq.*, 122
Dakin-Carrel tubes, 268
Dallas, Texas, 124
"Darius Green and His Flying Machine," 24
Davaine, Dr., 174
Deane, J. P., 130
Dearholt, Dr. Hoyt E., 238
Decay, 170 *et seq.* *See also* Bacteria, Germs
Democrat-Messenger, 30, footnote; 60
Dent, Ida B. M. Dent, 129
Dermatitis, 116
Dexter, N. B., 129
Dexter, S. T., 129
Dill, M. T., 127, 130

Diptheria, 78, 191, 304
Diseases of childhood, 78
Disinfection, 86 *et seq.*, 132
Dixmude, 149
"Doctor Who Stayed at Home, The," 142, 143
Doctors, 153-161. *See also* Physicians, Surgeons
Dodd, J. M., 130, 140
Dodd, Dr., John M., Jr., 100-102
Dodd, Dr. Samuel, 11
Dodd's Band, 65
Dodson, Dr. John W., 154
Dogs, 36
Dotysburg, 11
Dover, 147
Draden, Dr. William H., 67
Draft Board, 140
Drainage, 78
Dresden, 135

Early, Dr. L. M., 74
Easter Rock, 33
Eau Claire, Wis., 80, 144
Eclecticism, 75
Edinburgh Convention, 146
Education, medical, 312
Educational Society of the Congregational Church, 127
Egyptians, 179
Elks, 123, 124
Ellis, Dr. Edwin, 130, 155 *et seq.*, 156
Ellis, J. S., 156
Ellis, Martha Baker, 156
Ellis, Rev. Walter M., 130
Elms, 119
Embryonic growth, 305
Emergency surgery, 85, 94 *et seq.* *See also* Surgery
England, 50, 115, 146 *et seq.*
English, 18
Epidemics, 85 *et seq.*
Ethics, professional, 75, 76, 308 *et seq.*
Eton, 62, 146
Europe, 107, 115, 146-152
Evans, P. L., 130
Everest, Lena M., 130

Fakers, 102, 103
Farming, 38-53
Feather-beds, 18
Feet, 285-290
Femoral artery, 258-260
Fenenga, M. J., 127
Fevers, 175
Fibula, 158 *et seq.*
Flanders Fields, 149
Flint-locks, 35
Fluoroscope, 116, 117
Food, 25 *et seq.*, 188 *et seq.*
Ford car, 104
Fortier, J. A., 129
Fox-hounds, 36, 37
Fractures, 222 *et seq.*, 258 *et seq.*, 261
France, 115, 134, 150
Frankenburg, Dr. Otto, 74
French, Charles L., 129
Fruits, 25-27
Fuel, 120, 121
Fuller, H. H., 130
Fullerton, Dr. E. B., 74

Gangrene, 222
Gastro-enteritis, 101
Geese, wild, 24
Germs, 78, 169-191, 304. *See also* Bacteria
Ghosts, 45, 46
Gibson, Grace L., 129
Gilliam, Dr. D. Tod, 74
Gilman, Laura, 125, 140, 141
Goeltz, Adam, 157
Goeltz, Conrad, 157

Goetzenberger, Peter, 157
Goetzenberger, William, 157
Gorgas, General, 140
Gordon, Antoine, 156, 157
Grand View, Wis, 126
Gray's "Elegy," 146
Green, S. L., 129
Greene, General Nathaniel, 13
Grist-mills, 14
Gun-shot wounds, 95 *et seq.*

Habits, pioneer, 16-29
Hagerstown, Md., 107
Halderman, Dr., 74
Hall, Dr. S. S., 84
Hallucinations, 98, 99
Hamburg-American Line, 133
Hampton Court, 146
Hams, 26
Hannum, Dr. Henry, 155
Hanson, Peter, 130, 175
"Hants," 45, 46
Harmon, Harriet, 130
Harvesting, 49-51
Havre, 152
Heating, pioneer, 17, 18, 40, 41
Hemorrhage, 83, 98, 105, 158
Hernia, 299
Hibbing, Minn., 110
Hippocrates, 170
Hitchcock, W. C., DD., 129, 130
Homeopathy, 75
Honey, 37
Hoover, Dr. Thomas C., 74
Hope, Ellen, 129
Hopkins, Dr. C. W., 153
Hoppenyan, Bernard, 157
Horse-rack, 27
Hospitals, 80, 81, 82, 85-93, 95, 98, 103, 219, 229-240, 241
Houghton, Wis., 120
House-fly, 86 *et seq.*, 187
Houses, pioneer, 15, 16
Howard, Dr. C. Curtis, 74
Hudson (car), 112
Hunting, 34, 35, 36, 37
Huxley, Professor, 175, 176

Illinois, 38
Imperator, 133
Industrial Commission, 299-300
Interns, 250, 251
Irish Sea, 132
Iron, 60
Ironwood, Mich., 110

Jackson Park, 120
Jadzewsky, 99, 100
Jefferson Medical College, 73
Johnson, G. A., 130

Kaiser, The, 133
Kelly, Dr., 196
Kendrigan, J. T., 129
Kennedy, Mrs. Augusta, 156
Kepler, Kate M., 130
Kidder, Samuel T., 129
Kilburn, George, 157
Knickerbockers, 11
Knitting, 16, 17
Koch, Dr., 175
Kodaks, 115

La Pointe, Wis., 126, 127
Laboratories, 248, 249
"Lake Shore" Railroad, 158
Lake Superior, 104
Lane plate, 224, 263-264, 273, 275
Laparotomy, 82
Latent Vitality of Seeds, The, 178
Lees, Walter, 113, 114
Lewis, G. L., 129
Liberty Street, 73
Line-fences, 48, 49
Liquor-control, 57, 58

Lister, Dr. Joseph L., 172, 173
Live stock, 122, 123
Liverpool, 135
"Local History of Greene County, The," 60
Lockjaw, 187
Lœffler, 175
Log-rolling, 43, 44
Log-sled, 58
London, 131-133, 146 *et seq.*
Los Angeles, 124
"Lost Manhood," 102
Loving, Dr. Starling, 74
Lumber, 69, 86, 121. *See also* Timber
Lumber camps, 86

Malaria, 187
Manfredi, 187
Manual of Bacteriology, 185 *et seq.*
Maple-sugar, 41, 42
Maples, 119
Marriage, 81
Masons, 124, 153
Mattresses, 17, 18
Mayo, Doctors, 154
McClary, Clark, 68-70
McDowell, Dr., 206
McGonagle, W. A., 130
McLaren, Dr. Archibald, 153
McLaren, Ian, 155
Medical Advisory Board, 140 *et seq.*
Medical Board, 136-138
Medical education, 73 *et seq.*
Medical Group, 291-295
Medical pioneers, 103
Medical Reserve Corps, 140 *et seq.*
Medical science among the pioneers, 19
Medical Veterans of the World War, 140
Mendum, Alonzo T., 129
Mental Healing, 303
Mental impressions, 11
Merrimac, 114
Mertens, Dr. H. G., 103-105
Metatastic extension. *See* Cancer
Metchnikoff, Dr., 208
Methodists, 17
Michigan pine, 69
Middle thigh, 158 *et seq.*
Mills, Thomas B., 124
Milwaukee, 82, 85
Milwaukee, 82
Miners, 21
Monitor, 114
Monolith, 120
Monongahela River, 13
Montauk, 87
Morris, Betty, 11
Catherine, 12
Eleanor, 12
Eliza, 12
George, 12
Hannah, 11
Harriet, 12
Ingram, 12
James, 11
Job, 12
John, 11
John, 12
Richard, 11
Thomas, 12
William, 11
Morrisville, 11
Mosquitoes, 187
Murphy, Dr., 153

Naples, 187
Nash (car), 112
National Guard of Pennsylvania, 71
National Pike at Brownsville, 13
Nelson, Rev. G. W., 130
Nelson, Hon. R. R., 156

Neoplasms, 83
Nephritis, 283
New England, 127
New York, 11, 100, 101
New York University, 156
Newport News, Va., 113
Nicolaier, 175
Nigger Rock, 33
North Wisconsin Academy, 123, 126, 129
Northland College, 123, 126-130
Nurses, 82, 85 *et seq.*, 251-254
Nutting, 31

Obermeier, 175
Obetz, Dr. Nelson, 74
Ochsner, Dr., 153, 154
Ohio, 12
Ohio State University, 73, 76
Officers Reserve Training Corps, 152
Old Ironsides, 153
"Old Log Cabins, The," 30
Old oaken bucket, 16
Omaha Railway, 153
Operations, 95-105. *See also* Surgery
Oshkosh, 82
Ostend, 146
Outdoor Arts League, 119
Ovaries, 201-206
Oviatt, Dr. C. W., 82
Oxford, 146
Ox-team, 113

Page, Walter Hines, 133
Panama Canal, 101
Panama Mail Steamship Company, 101
Parham & Martin band, 273, 276
Paris, 144, 151
Parker, Sir Gilbert, 141
Pasteur, 172 *et seq.*
Peabody, H. E., 130
Pelvic surgery, 83. *See also* Surgery
Pennsylvania, 11, 12
Pennsylvania Railroad, 71
Perforation of the bowel, 95, 196
Peritonitis, 94, 192-200
Perityphilis, 78. *See also* Appendicitis
Peterson, Miss Ellen, 85, 86
Peterson, Emelia C., 125, 141
Pewter, 27
"Petroleum, Mrs.," 74
Philadelphia, 73
Photography, 115-117
Physicians, 153-161. *See also* Doctors, Surgeons
Pike, Wis., 120
Pilgrim's Progress, 39
Pioneers, 11-29, 103
Pittsburgh, 24, 73
Plastic surgery, 83. *See* surgery
Politics, 123, 244
Pope Manufacturing Company, 107
Pope Tribune, 107
Popular Science Monthly, 178
Porch Rock, 33
"Possum"—hunt, 36
Powder, 27, 34, 35
Practice, medical, 85-93
Practitioners, classes of, 138, 309-313
Pratt, C. H., 126, 130
Pray, A. T., 130
Pregnancy, 83, 98, 203
Prentice quarry, 120
Prince, Eugene F., 157
Probst, Dr. C. O., 74
Protestants, 91
Protoplasm, 176, 177
Puerperal sepsis, 213-214
Pus, 174 *et seq.*

Quarries, 120
Quebec, 131, 135
Quilting bee, 44, 45

Radio, 101-102
Red Cross, 141, 143
Reims, 150 *et seq.*
Peineking, Dr., 153
Religion, 91, 92
Restoration of human frame-work, 261 *et seq.*
Revolutionary War, 19
Rhinelander, Wis., 80
Riggs, Dr. C. Eugene, 124, 153
Rinehart, Dr. W. T., 72, 80, 81, 82, 154
Rishmiller, Dr. John H., 131
Roads, pioneer, 20, 21, 22
Rock crushing, 22
Roehm, Martin, 157
Roemtgen, 117. *See also* X-ray
Rosenbach, Dr., 175
Rotarians, 115, 146
Rouse, Rev. Fred T., 130
Royal College of Surgeons, 162
Ruptures, 83

S. O. S., 101
St. Francis Hospital, 73
St. Joseph's Hospital, 90-92. *See also* Sisters of St. Joseph
St. Paul, Minn., 99
Saloons, 57, 58
San Francisco, 100, 101
Sanborn, A. W., 128, 130
Sarcoma, 303
Saw-mills, 14 *et seq.*, 99
Scarlet Fever, 304
Schlachter, Fritz, 129
School days, 62-66
Schroeder, Dr., 172
Schwan Dr., 172
Schweppe, F. I., 130
Scobie, Andrew, 157
Scotland, 15, 20, 50, 115
Scott, Sir Walter, 146
Senn, Dr. Nicholas, 82, 153, 199
Sepsis, 196, 207-215, 269
Service, medical, 296-300
Sharpneck, Dr. F. H., 153
Shaw, Archibald O., 140
Shingle-making, 56 *et seq.*
Sheldon, Dr. Charles S., 84
Shores, E. A., 130
Shot, 27, 35, 36
Shotguns, 34, 35, 36
Shumaker, Dr. W. T., 153
Sinclair, Duncan, 157
Sioux River, 104
Sister's of St. Joseph, 81
Skates, 32
Sleighs, 100
Sleyster, Dr. Rock, 84
Slovak, 105
Smallpox, 87-89
Smiles, Dr. C. J., 125, 140
Smith, Leroy W., 67
Snowmobile, 100
Snuff, 27
Soap-making, 41
Soo Line, 131, 153, 216
Soo Surgical Association, 206
Spanish-American War, 87, 142
Speicher, E. E., 129
Spelling-school, 64
Sperry, Dr. W. P., 155
Spirilla, 177
Sputum, 78
Squirrel hunting, 34
Still-houses, 14, 57
Starling Medical College, 73, 76, 153
State Board of Health, 244
State Board of Medical Examiners, 234
State Highway Commission, 123

State Medical Societies, 83, 84
Sterilization, 132
Sternberg, Dr. George M., 83, 176
Sternberg's *Manual of Bacteriology*, 185 *et seq.*
Stolp, J. A., 130
Stoops, Miss Zura, 81
Stomach Surgery, 82 *et seq.* *See also* Surgery
Sugar, 25, 41, 42
Superstitions, 45, 46
Surgeons, 162 *et seq.*; 217 *et seq.*; ideals of, 310-313
Surgery, 77, 82, 83, 94, 95, 96 *et seq.*; 189, 221-229, 270 *et seq.*; kinds of, 307 *et seq.*
Symptoms, 77, 78, *et seq.*

Teaching, 63 *et seq.*
Technique, Medical, 83
Temple, "Tuff," 65
Tetanus, 187
Thames, 146
Thomson, Mabel, 129
Threshing, 51, 52
Timber, 46-48, 54 *et seq.*, 119-121
Tompkins, W. M., 161
Toxæmia, 283
Tracheotomy, 97, 98
Trafalgar Square, 133
Training-schools for nurses, 85-93, *passim.* *See also* Nurses
Trapping, 35, 36
Travel, 24 *et seq.*
Trevitt, Dr. A. W., 80
Trevitt, E. L., 80
Tribune bicycle, 107
Trinity churchyard, 11
Trinity Hospital, Milwaukee, 85
Trundle-beds, 17
Tuberculosis, 78
Tumors, 203 *et seq.*; 304, 305, 306
Tunisian, 133
Tyndall, 172, 175
Typhilitis, 78
Typhoid, 78, 85, 191, 304

United States Public Health Service, 141
United War Charities, 143
"Up-on block," 27

Vaccination, 86
Van de Riet, G. J., 130
Vandenberg, Dr. C. R., 74
Vaterland, 133
Vaughn Library, 123, 129
Versailles, 149
Veterans' Bureau, 141, 144
Vindictive, 147
Vomiting, 196, 197

Wages, 52
Waite and Bartlett, 116
Washington, Pa., 23, 71, 78
Waterloo, 150
Watson, J. A., 130
Wausau, Wis., 80
Waychoff, A. J., 30
Waychoff, Professor Andrew, 60, 61
Waychoff, Challen, 60
Wayne, General Anthony, 113
Waynesburg, Pa., 23, 60
Waynesburg College, 68
Wells, 78
Western Pennsylvania Medical College, 73
Wheat, 49-53
Wheaton, Dr. C. A., 153
Wheeler, E. P., 130, 157
Wheeler Hall, 127
Whiskey, 57, 58
White, Dr. G. M., 74
Whittlesey, Asaph, 157

Widal test, 78
Wilkin, Hon. Wescott, 156
Willes, Hon. Charles D., 156
Windsor, 146
Winslow, Irving L., 130
Wisconsin, 79, 81, 122, 125
Wisconsin Central Railroad, 158
Woodcraft, 54-61
Wood, 120, 121
Woods, Henry, 127
World Fair, Chicago, 120
World War, 87, 133, 134, 140-145
Worm-fences, 47, 48
Wright, Rev. A. D., 130

X-ray, 115 *et seq.*, 219, 249, 262, 264, 265, 266, 271, 274, 275, 288, 289

Y. M. C. A., 123
Young, Dr. M. L., 125
Ypres, 149, 150

Zebrugge, 147, 150